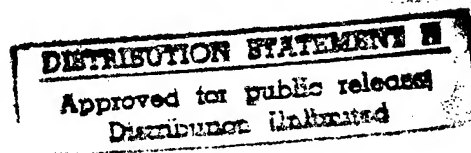




Final Health and Safety Plan

Fort Devens, Massachusetts



Submitted to

U.S. Army Environmental
Center (USAEC)
Formerly USATHAMA
Aberdeen Proving Ground, Maryland

Revision 1
June 16, 1993

19970820 111

Arthur D. Little, Inc.
Acorn Park
Cambridge, Massachusetts
02140-2390

DTIC QUALITY INSPECTED 3

ADL Reference 67064(5)

DAAA15-91-D-0016

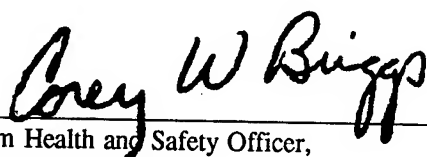
Final Health and Safety Plan

Arthur D Little

**Fort Devens,
Massachusetts**


Project Manager, Robert Lambe

16 JUN 93
Date


Program Health and Safety Officer,
Corey W. Briggs CIH,CET

Date

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Health and Safety Plan:Fort Devens
Section No.: Table of Contents
Revision No.: 1
Date: June 16, 1993

Forward

This Health and Safety Plan (HASP) is designed to provide general coverage of a broad range of health and safety issues in support of activities associated with site investigations, evaluations, and studies at Fort Devens, Massachusetts. These activities are carried out as required in Delivery Orders awarded under the Arthur D. Little TEPS Contract DAAA15-91-D-0016 with the U.S. Army Environmental Center (USAEC). This HASP documents items that are general to work being undertaken at Fort Devens. Delivery Order specific information is provided in supplements to this HASP. These supplements incorporate the more general information by reference.

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Section No.: Appendix G
Revision No.: 2
Date: May 6, 1994

Appendix G: Laboratory Hygiene Plan

1.0 Introduction

Personnel involved in remedial investigations and field sampling at sites where hazardous substances (hazardous materials, and wastes) are present may be potentially exposed to a wide variety of chemical, physical, environmental, biological, and ergonomic hazards, including:

- Inhalation of toxic airborne contaminants;
- Skin contact with contaminated soil and water;
- Presence of flammable/combustible vapors;
- Oxygen-deficient atmospheres;
- Unexploded ordnance;
- Heat stress due to protective clothing and environmental conditions;
- Etiologic agents and biological hazards; and
- Physical hazards inherent to field operations (e.g., working near heavy equipment, slips, trips, falls).

Thus, adequate planning is essential prior to performing work at sites containing hazardous substances in order to minimize the risk of employee injury or illness.

Field investigation tasks to be performed by Arthur D. Little at Fort Devens include the following:

- Geophysical surveys;
- Unexploded ordnance (UXO) clearance;
- Test pit excavation;
- Surface water and sediment sampling;
- Surficial soil sampling;
- Concrete and asphalt sampling;
- Soil borings;
- Ground water sampling;
- Building wipe sampling.

More detailed description of these activities are provided in the site-specific HASPs included in the supplements to the HASP, as well as in the Work Plans and the Quality Assurance Project Plan for Fort Devens.

The following Health and Safety Plan (HASP) has been prepared for the use of Arthur D. Little field personnel during work at the U.S. Army's Fort Devens facility located in Fort Devens, Massachusetts. This HASP also provides minimum requirements for subcontractors employed by Arthur D. Little for site investigation tasks and authorized onsite visitors. At a minimum, an authorized visitor shall meet

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the requirements of Sections 3.0 and 4.0 of this HASP. Supplements to this HASP provide information specific to each Delivery Order. All personnel covered by this plan shall comply with all the requirements contained within the plan. The overall purpose of this Health and Safety Plan (HASP) is to provide personnel protection standards and mandatory safety practices, procedures, and contingencies while performing the tasks outlined in the scope of work. Any discrepancies between the requirements of this HASP and what occurs onsite or is scheduled to occur should immediately be brought to the attention of the Site Health and Safety Officer (identified in the HASP Supplements). The Arthur D. Little Health and Safety Officer (HSO) reserves the right to modify the contents of this HASP at any point during the project and as new information is received. Any modification to the contents of the HASP will be provided to USAEC for approval.

The overall objective of this Health and Safety Plan is to provide onsite personnel with the required procedures which are needed to ensure safe working conditions. The safety organization and procedures contained in this plan have been established based on an analysis of potential site hazards and personnel protection measures have been selected in response to these hazards.

All work will be conducted in accordance with applicable federal, state and local regulations, including the U.S. Department of Labor, Occupational Safety and Health Administration (OSHA) requirements of 29 CFR 1910 and 1926. This plan is primarily intended to satisfy the requirements set forth by OSHA in the Hazardous Waste Operations and Emergency Response Standard (29 CFR 1910.120). Other workplace standards or guidelines shall be used in lieu of OSHA standard when they are more stringent than OSHA standards or when no OSHA standard exists. Examples of such guidelines include recommendations proposed by the American Conference of Governmental Industrial Hygienists (ACGIH), the National Institute of Occupational Safety and Health (NIOSH), and existing U.S. Army standards (e.g., EOD). This plan shall also be implemented in accordance with EPA's protocol *Guidelines for Conducting Remedial Investigations and Feasibility Studies under CERCLA* (EPA 540/G-85). The most recent copy of the Arthur D. Little Hazardous Waste Site Health and Safety Program Plan (April 6, 1992) shall be the reference document for other Arthur D. Little specific health and safety policies and procedures regarding work at hazardous waste sites.

2.0 Staff, Organization, and Responsibilities

2.1 Project Staff and Health and Safety Organization

The personnel and their organizations listed below will be performing various onsite and/or offsite activities (see Figure 2-1). The USAEC Project Manager will be notified promptly of any potential onsite health and safety problems and changes in the health and safety organization. Telephone numbers are provided in Section 7.8.8 of this plan.

2.1.1 USAEC

- Project Manager: See Delivery Order Specific Supplement
- Health and Safety Officer: William P. Houser

2.1.2 Arthur D. Little, Inc.

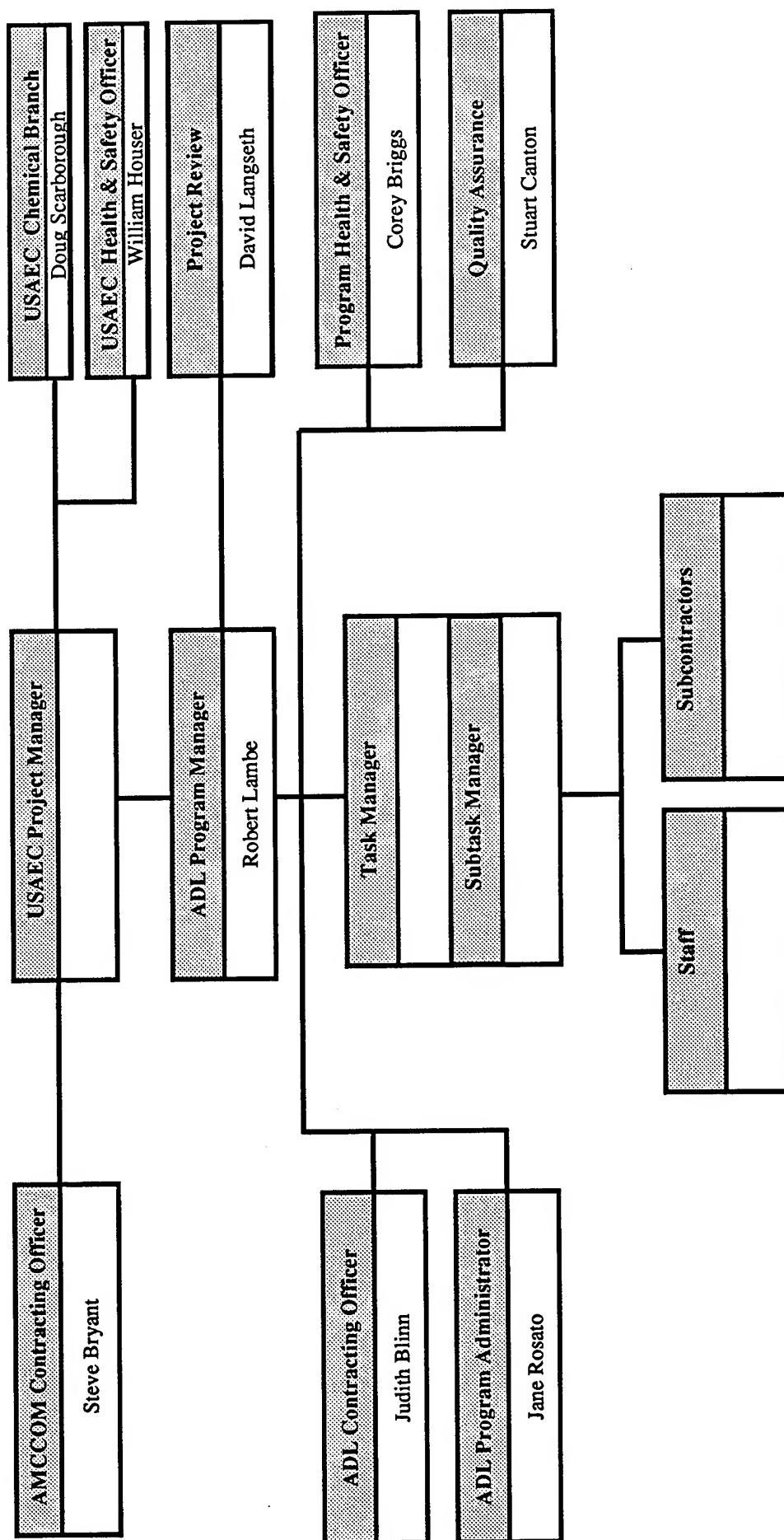
- Program Manager: Robert Lambe
- Task Manager: See Delivery Order Specific Supplement
- Deputy Task Manager: See Delivery Order Specific Supplement
- Health and Safety Staff:
 - Corporate Director of Health and Safety (CDHS): R.S. Stricoff, CIH, CSP
 - Project Field Supervisor: See Delivery Order Specific Supplement
 - Health and Safety Officer (HSO): Corey Briggs, CIH CET
 - Health and Safety Officer, Alternate: Peter Roy, CIH
 - Site Health and Safety Officer (SHSO): See Delivery Order Specific Supplement
 - Site Health and Safety Officer, Alternates: To be determined
 - Task Health and Safety Officer (THSO): To be determined in the field

2.2 Responsibilities

2.2.1 Task Manager/Deputy Task Manager

- Day-to-day liaison with USAEC Project Manager
- Reviews and approves the initial site-specific Health and Safety Plan and any future revisions or amendments; coordinates any modifications with USAEC
- Assures that fieldwork proceeds according to requirements of the Health and Safety Plan
- Coordinates with the Health and Safety Officer and the Site Health and Safety Officer
- Responsible for onsite implementation and enforcement of the Health and Safety Plan by all project personnel
- Designates field personnel who meet qualification requirements of the site-specific Health and Safety Plan

Figure 2-1
Fort Devens Organizational Chart



- Coordinates with all Arthur D. Little subcontractors to ensure that they are informed of, agree to, and comply with all requirements of the HASP

2.2.2 Project Field Supervisor

- Coordinates and supervises all fieldwork

2.2.3 Corporate Director of Health and Safety (CDHS)

- Gives final authority on all health and safety issues, concerns, or conflicts that impact the project
- Exercises supervision and control over company's health and safety program

2.2.4 Health and Safety Staff (HSO and Alternate HSO)

- Prepares the site-specific Health and Safety Plan
- Provides ongoing industrial hygiene and safety support to the project
- Acts as the primary health and safety liaison to USAEC SES Branch
- Conducts health and safety site orientations, training, and periodic safety inspections/audits, as required

2.2.5 Site Health and Safety Officer (SHSO)

- Coordinates all onsite health and safety activities
- Provide health and safety briefings
- Monitors the field investigations to ensure compliance with the Health and Safety Plan
- Reports deviations from the Health and Safety Plan to the Project Manager and HSO
- Recommends modifications of the Health and Safety Plan to the Project Manager and HSO as soon as practical once it is apparent that the plan should be modified
- Establishes Exclusion Zones
- Oversees the distribution, use, maintenance, and disposal of personnel protective equipment and clothing
- Coordinates the prohibition of non-essential personnel outside the Exclusion Zone boundaries
- Uses appropriate portable field instruments and personnel as specified in the plan (Section 5.0) to monitor site conditions in the Exclusion Zones
- Maintains a log of field activities, monitoring, and site conditions, and submits appropriate summary reports
- Prepares any incident reports
- Stops work when unacceptable health and/or safety hazards and/or risks exists

2.2.6 Site Health and Safety Officer - Alternates(s)

- Assumes all functions and responsibilities of the SHSO in his/her absence

2.2.7 Task Health and Safety Officer

- Designated by the SHSO, a member of each independent team or group of personnel onsite conducting field work shall be responsible for the health and safety actions of that team (e.g., air monitoring). Responsibilities include determining if contaminant levels exceed an action level, or assuring that the team maintain communication via predetermined methods - visual, auditory, walkie-talkie, etc.

2.2.8 Field Geologists, Sampling Technicians, Chemists, and Field Personnel

- Comply with the requirements of the Health and Safety Plan
- Immediately notify the SHSO of hazardous or potentially hazardous or unsafe conditions or environments that are not addressed or are not adequately addressed in the plan
- Immediately notify the SHSO and Project Manager of any onsite accidents or exposures
- Conduct work consistent with normal safe working procedures for a comparable work site
- Attend all onsite/offsite Health and Safety Briefings
- Comply with current training and medical surveillance requirements

2.2.9 Subcontract Personnel

Subcontractors and their personnel must possess current training and medical surveillance as required by 29 CFR 1910.120 and Arthur D. Little contract provisions. Certification of training and medical surveillance for all subcontractors will be maintained on site by Arthur D. Little.

Subcontractor personnel will:

- Designate a crew leader in charge of on-site project activities
- Review the Health and Safety Plan and ensure adherence to the plan
- Shall sign-off with regards to all provisions of the plan
- In matters of safety and health, comply with the instruction provided by the Site Health and Safety Officer (SHSO)

3.0 Hazard Communication and Training

3.1 Health and Safety Training

All onsite management and field personnel, including subcontractor personnel, shall have received training and/or experience which at a minimum satisfies the OSHA regulations for hazardous waste operations and emergency response (29 CFR 1910.120). Highlights of a training program that meets OSHA regulations and is acceptable to Arthur D. Little is provided in Appendix A. Once basic training has been received, annual refresher training must also be completed in accordance with Arthur D. Little's scheduling requirements. A minimum of two field team members onsite should be first aid and CPR trained and orientated to the hazards of bloodborne pathogens. First aid training requirements will be waived for document review, interview, and site tour activities.

All personnel, including subcontractor personnel, who will be within any established Exclusion Zone shall have completed a respiratory protection training program which at a minimum satisfies the OSHA regulations (29 CFR 1910.134). This program shall include: 1) instruction in the proper use, limitations, and care of respirators; 2) proper fitting of personnel for a respirator, using either a qualitative or quantitative fit test method; and 3) teaching personnel how to conduct either a positive and/or negative pressure fit test. Personnel shall be fit tested and assigned a respirator model and size that will be available to them for site work.

Training records for Arthur D. Little personnel are maintained at Arthur D. Little's Cambridge, Massachusetts corporate office. Certification documents for all field team members and subcontractors will be maintained onsite. Field documentation will be maintained utilizing Attachment A, Training and Physical Examination Record. This form shall be completed by the SHSO or his/her alternate for all Arthur D. Little personnel, subcontractor personnel, and authorized visitors.

Authorized site visitors and other individuals who enter the Exclusion Zone must attend a pre-entry briefing where they will be briefed about site operations, potential hazards, and the necessary precautions. All visitors must be accompanied by an Arthur D. Little escort when visiting the site.

3.2 Health and Safety Site Orientation

The SHSO, with the support of Arthur D. Little's Health and Safety support staff, if requested, shall conduct a health and safety site orientation prior to the initiation of field activities. The orientation will cover all aspects of the site-specific Health and Safety Plan with special emphasis placed on explosives and ordnance safety. This

session will also serve as a formal review of site hazards and potential health effects, the Accident Prevention Plan (Appendix C), safe work procedures and precautionary measures, use of personnel protective equipment, decontamination procedures and emergency response procedures. All field staff are required to attend these briefings. This orientation, in addition to periodic Health and Safety Briefings, shall act as the informational programs in accordance with OSHA 1910.120. Material Safety Data Sheets (MSDS) for chemicals used onsite shall be maintained by the SHSO and will be accessible to all personnel upon request. All site personnel will be required to sign off in the HASP Review Record (Attachment B) prior to conducting onsite activities. This form shall become part of the site records.

A Pesticides Health and Safety Awareness session will also be conducted for all personnel working on this project.

3.3 Site Documentation

The Site Project Manager and the SHSO shall maintain field logbooks in accordance with the standard operating procedures, policies and practices established by Arthur D. Little.

Records required by the state and federal government will be kept current. Records of health and safety activity at the site will be maintained, including records of health hazard surveys, evaluation of potential hazards, and control measures taken. These records will document representative exposure levels during waste handling and sampling and the degree of hazard. Site employees will be continually informed of exposure levels and the degree of safety measures required for protection from the hazards present. The documented exposure monitoring will serve as a record of assessment of the respiratory hazards at the particular operation of the project and will include the following:

- Determination of personnel activity in the working area:
 - job routines
 - work locations
 - time spent in work areas
- Determination of any potential respiratory or dermal hazards:
 - chemical composition
 - type of air contamination

- toxicity at various concentrations (acute versus chronic)
- established concentration limits for inhalation and/or skin contact
- Determination of whether to improve the administrative controls

Applicable data will be available to onsite personnel throughout the project. Records of all sampling methodology, calculations, results, reports, and recommendations will be kept for a period of at least three years after completion of the project.

3.4 Health and Safety Briefings

The SHSO will conduct a daily Health and Safety Briefing. Topics to be covered, as needed, include personal protective equipment, personnel and equipment decontamination procedures, accident prevention, emergency notification, and any modifications or amendments to the Health and Safety Plan etc. Onsite field staff are required to attend the briefing and attendance will be documented in the field log book.

3.5 Post-Investigation Health and Safety Briefing

Arthur D. Little does not traditionally conduct a formal end of field investigation briefing. We do encourage input from field personnel during the course of the project and plan to conduct onsite health and safety reviews to determine compliance with the provisions of the health and safety plan. In addition, previous site work is also discussed at annual refresher training.

3.6 Subcontractor Personnel

All subcontractors shall conduct their work in accordance with the policies and procedures outlined in this Health and Safety Plan, or provide to the HSO a health and safety plan that meets or exceeds the requirements of this plan and which must be included in this document for USAEC approval. Subcontractor health and safety plans, as needed, will be included in this document through addenda which reference and provide appropriate attachments containing the referenced plans.

4.0 Medical Surveillance and Exposure Monitoring

In order to be authorized for project fieldwork all Arthur D. Little and subcontractor personnel must be certified as having met the following minimum requirements:

4.1 Medical Surveillance

In compliance with OSHA medical surveillance requirements (29 CFR 1910.120), supervisory personnel and field personnel, including subcontractor personnel, shall have received an examination by a licensed physician. The most recent exam shall have been given within the 12-month period proceeding this work, and each employee shall have been determined by the attending physician to be physically able to perform the work and to use respiratory and other protective equipment as typically required for a field investigation of this nature. A summary of a medical monitoring program which meets OSHA regulations and is acceptable to Arthur D. Little is provided in Appendix B. Arthur D. Little's Hazardous Waste Site Medical Surveillance program is coordinated through the Mt. Auburn Hospital Occupational Health Department in Cambridge, Massachusetts. The physician in charge, Dr. Robert Ullian, will be notified of Arthur D. Little's onsite activities.

Due to the potential onsite pesticide contamination personnel may be required to have special biological monitoring to determine pre- and post exposures (e.g., organophosphorus pesticides).

Records of medical surveillance for Arthur D. Little personnel are maintained at Arthur D. Little's Cambridge, Massachusetts corporate office. Certification documents for medical surveillance for field team members and subcontractors will be maintained onsite. Field documentation will be maintained utilizing Attachment A, Training and Physical Examination Record. This form shall be completed by the SHSO or his/her alternate for all Arthur D. Little personnel.

4.2 Exposure Monitoring

Personal air sampling in worker breathing zones as well as area sampling may be periodically conducted, where necessary, to evaluate the adequacy of respiratory protection and to determine the need for changes in the level of protection. Each area of concern and study area has been assessed for hazards and the appropriate monitoring program has been designate for each. In cases of personal exposure, individual site-specific safety and health plans will identify the route to the Cutler Army Hospital.

5.0 Health and Safety Equipment

5.1 Personal Protective Equipment

5.1.1 General

Based on site conditions and action levels the SHSO shall confer with the HSO regarding the upgrading or downgrading of personal protection.

Modified Level D protection shall be used at the start of field work. Modified Level D protection shall include use of the following items:

- Standard work clothes or coveralls;
- Disposable white Tyvek coveralls or equivalent;
- Hard hat;
- Steel toe/steel shank PVC boots, or similar leather boot with an impervious boot cover;
- Safety glasses with side shields (all sunglasses and prescription glasses used on-site must also be impact resistant and fitted with side shields); and
- Chemical protective gloves (e.g., nitrile) and Silvershield or 4H undergloves shall be worn when collecting surface water, sediments or soil samples or when sampling, bailing or developing wells.

An upgrade to Level C may be required if the level of VOCs detected in the worker's breathing zone exceeds an established Action Level of 5 ppm. Level C protection will include all of the PPE required for Modified Level D plus the following:

- Replace white Tyvek with Saranex Tyvek coveralls; and
- Use disposable outer boots and an appropriate full face air purifying respirator.

The specific respirator for Level C protection shall be the MSA Ultra Twin full-face respirator (APR) with GMC-H combination cartridges (MSA Part No. 460844), or equivalent. The GMC-H cartridge is approved for organic vapors and acid gases (not more than 1,000 ppm), dusts, fumes and mists having a time weighted average less than 0.05 mg/m³, radionuclides, and asbestos (TC 23C-153). Respirator cartridges will be changed at the first sign of breakthrough or loadup, or at the discretion of the SHSO.

Provisions shall be made by personnel to upgrade to Level B protection if conditions warrant during drilling and other potentially high exposure activities. Level B protection will include all of the PPE required for Level C plus the following:

- Replace the APR with either a pressure-demand SCBA or a pressure-demand airline respirator with an in-line 5-minute escape bottle.

Arthur D. Little personnel are prohibited from performing Level A activities. If Level A activities are warranted, a suitably qualified subcontractor will be selected.

It shall be the responsibility of the SHSO, in coordination with the HSO, to make the determination of the level of PPE to be used by personnel within the particular Exclusion Zones. The decision of the SHSO will be based on site monitoring and action levels and associated hazards, knowledge of the site, observed site conditions, and applicability of the Arthur D. Little Health and Safety Program for Hazardous Waste Site Activities Program Plan.

5.1.2 Respiratory Protection

The following is a list of general provisions regarding the use of respiratory protective equipment.

- Only properly cleaned, inspected and maintained, NIOSH/MSHA approved respirators shall be used on site.
- Selection of respirators as well as any decisions regarding upgrading or downgrading of respiratory protection will be made by the SHSO in conjunction with the HSO.
- Air purifying cartridges shall be replaced when "loadup" or "breakthrough" occurs, unless otherwise recommended by the SHSO.
- Only employees who have had pre-issue and annual qualitative fit tests thereafter, shall be allowed to work in atmospheres where respirators are required. Forty-hour HAZWOPER training is mandatory for all respirator wearers.
- If an employee has demonstrated difficulty in breathing during the fitting test or during use, he or she shall have their physical condition re-evaluated to determine whether the employee can wear a respirator while performing the required duty.
- No employee shall be assigned to tasks requiring the use of respirators if, based upon the most recent examination, a physician determines that the employee will be unable to function normally wearing a respirator or that the safety or health of the employee or other employees will be impaired by use of respirator.

- Contact lenses are not permitted onsite and are not to be worn while using any type of respiratory protection.
- If needed, air supplied respirators shall be assembled per manufacturer's specifications regarding hose length, couplings, valves, regulators, manifolds, etc.
- All air utilized for air supplied respirators will meet the requirements for at least Grade D breathing as specified by the Compressed Gas Association.
- Excessive facial hair (e.g., beards and large moustaches) prohibits proper face fit and effectiveness of air purifying respirators. Persons required to wear respiratory protection must not have any facial hair that interferes with the respirator seal.
- Regular eyeglasses cannot be worn with full face respirators (breaks the facepiece seal). Special eyeglass inserts must be utilized.
- The respiratory protection utilized on site will be in compliance with OSHA in 29 CFR 1910.134 and the Arthur D. Little Respiratory Protection Program.
- Respirators are to be inspected and cleaned daily per 1910.134. If respirators are not dedicated to individuals, disinfection is also required.
- Where air-purifying respirators are designated for protection against onsite contaminants, the employee shall be permitted to change canisters or cartridges daily or more frequently if excessive resistance develops or if breakthrough occurs.

5.1.3 Maintenance and In-use Inspection of Protective Equipment

Effective use of protective equipment requires that the equipment be properly used, maintained, and inspected periodically during the day. Site-specific issues and standard procedures will be reiterated during pre-entry training.

Gloves and coveralls will be regularly inspected and replaced promptly if torn. Disposable coveralls will be replaced whenever personnel leave the Exclusion Zone, daily at a minimum. Reusable gloves will be decontaminated whenever exiting the Exclusion Zone or Contamination Reduction Zone.

5.2 Environmental Monitoring Equipment

5.2.1 General

The SHSO shall designate one of the two team members as the Task Health and Safety Officer and this person shall use a properly calibrated HNu PI-101 photoionization detector (PID), or equivalent instrument, equipped with an 10.6 eV lamp, to:

- A. Monitor organic vapors at several on-site areas at the beginning of each day to establish a background reading.
- B. Monitor organic vapors at the worker's breathing zone, hand auger spoils, and above ground water wells.
- C. If elevated levels of organic vapors are detected, the worker's breathing zone will be monitored continuously while in the area, or for 15 minute periods every half-hour.
- D. Traditional industrial hygiene air monitoring for organic vapors and dusts may also be performed during potential high exposure activities, and at the discretion of the HSO.
- E. Monitor when work begins on a different portion of the site.
- F. Monitor when contaminants other than those previously identified are being handled.
- G. Monitor when a different type of operation is initiated.
- H. Monitor if personnel are working in areas with obvious liquid contamination.
- I. Monitor if a sufficient reasonable interval has passed so that exposures may have significantly increased.

Measurements shall be taken at the anticipated source and in the breathing zone of site personnel during all invasive operations. Response action levels are discussed above and are included in each site-specific health and safety plan.

Instruments shall only be used by employees who have been trained in the proper operation, use, limitations, and calibration of the monitoring instrument and who have demonstrated the skills necessary to operate the instrument.

The monitoring program may be expanded, reduced, or modified by the Arthur D. Little Health and Safety Officer (HSO) with concurrence of the Project Manager, based on site conditions and monitoring results. All monitoring will be accomplished under the direction of the SHSO who will interpret the results with the guidance of the HSO.

5.2.2 Real Time Air Monitoring

The air monitoring program will include sufficient monitoring of air quality in work zones and other on-site areas to assess levels of potential employee exposure, establish work zones, determine that the work zone designations are valid, and verify that the respiratory protection being worn by personnel is adequate. The air monitoring program is also designed to ensure that contaminants are not migrating off-site in order to minimize exposure of nearby populations, work areas and/or workers.

5.2.3 Perimeter Monitoring

If detectable concentrations are measured during the on-site activities, monitoring shall also be conducted at least two times each day with a total volatile organics direct-reading instrument at the perimeter of each site. If airborne levels of contaminants exceed background levels at the perimeter of any site, the work will be stopped and the suspected source of the contamination (e.g., borehole or monitoring well) will be covered to eliminate emissions. If the emissions are not reduced in a reasonable period of time (e.g., 15 minutes), the Arthur D. Little HSO and the Project Manager will be notified. A decision will then be made as to how to proceed with the work and how to more fully characterize the airborne emissions.

5.2.4 Flammable/Combustible Gases

Monitoring at potential sources of combustible gases shall be conducted periodically during operations involving penetration of soils. If instrument readings indicate 10 percent of the lower explosive limit (LEL) or less, work shall continue with increased monitoring. If readings exceed 10 percent of the LEL, operations shall cease and personnel will withdraw until levels subside (at least 15 minutes). If levels do not subside, special arrangements for on-site portable ventilation systems may be needed.

5.2.5 Oxygen Deficiency

Oxygen levels will be periodically monitored using a direct reading combustible gas/oxygen meter. This would be especially true in low lying areas and during activities around old landfills (methane). If monitoring indicates less than 19.5% oxygen, activities in the area will be stopped until the source causing the oxygen deficiency is identified and controlled.

5.2.6 Respirable Dust

Monitoring for respirable dust may be necessary to estimate employee exposure to heavy metals, pesticides and, semivolatile organic compounds which may comprise part of or be adhered to dust particles generated during site operations. Continuous monitoring of the site workers' breathing zone may be performed during all drilling operations using a direct-reading respirable dust monitor where the generation of dust is likely.

5.2.7 Calibration and Maintenance

All direct-reading instruments must be calibrated on a daily basis. A known concentration of a specific gas (e.g., isobutylene for the HNu) will be used. Instructions in the manufacturers' operations manuals regarding cleaning and maintenance of the instruments shall be followed.

The Field Sampling Plan (FSP) and the Quality Assurance Project Plan (QAPP) provide detailed information on the calibration and maintenance of field sampling and monitoring equipment. SOPs for select air monitoring devices (e.g., CGI/O₂ meter, Draeger kit, Rad Meter) are provided in the FSP. Manufacturers' operation and calibration instructions will be available on-site for all equipment for which an SOP is not available.

5.2.8 Recordkeeping Requirements

The results of air monitoring readings shall be recorded on air monitoring data forms as illustrated by Attachment C or in the field logbook. A calibration and maintenance log for each instrument shall also be maintained.

5.2.9 Heat Stress

Ambient temperatures at the site combined with the requirements for personal protective equipment (PPE) use could contribute to heat stress. While using nonpermeable PPE when ambient temperatures reach or exceed 70°F, work-rest regimens will be adjusted accordingly.

5.2.10 Action Levels

Action levels and the appropriate action are summarized below.

5.2.10.1 Chemical Vapors. Depending on the activities field work will commence with Modified Level D or Level C personal protection.

Based on positive direct reading instrument levels in the breathing zone or site conditions, the SHSO shall upgrade personal protection equipment requirements as described below.

The following action levels are based on PID *breathing zone readings* and observations of site conditions.

- Background or below: *Continue at Modified Level D.*
- Background to 5 ppm sustained for five minutes: *Upgrade to Level C and Continue Monitoring.*
- Greater than 5 ppm above background sustained for five minutes or a peak reading of 30 ppm or greater: *discontinue operations in that immediate area. Make arrangements to further characterize airborne contaminants via personal and area monitoring including contaminants that could be present which are not detected by PID equipment. Contact the HSO for advice on how to proceed. Level B protection may be needed for work to continue.*

5.2.10.2 Explosive Limit Detection. Based on a positive reading on the combustible gas indicator of 10% of the lower explosive limit (LEL), all workers shall not enter, but shall retreat immediately from the area and evaluate the situation. Report observations and instrument readings to the SHSO, who will advise workers on safety measures necessary before returning to work in the area. A means of ventilation may be required in order to resume work in this area.

5.2.10.3 Oxygen Deficiency. If monitoring indicates less than 19.5% oxygen, all workers shall not enter and/or shall retreat immediately from area. Activities will be stopped until the source causing the oxygen deficiency is identified and controlled. Report observations and instrument readings to the SHSO, who will advise workers on safety measures necessary before returning to work in the area. A means of ventilation may be required in order to resume work in this area.

5.2.10.4 Radiation Detection. To our knowledge, no radiation monitoring has been conducted in the areas of concern. From our initial review of site documentation, radioactive areas are not anticipated to be encountered. However, prior to initiating work, a general survey will be conducted in each of the study areas as a precautionary measure only. If it is determined that a radiation monitoring plan is required, contact the HSO or Arthur D. Little's RSO. Site personnel must then comply with the following action levels when the radiation monitoring program is in effect:

Total External Exposure

$x < 100 \text{ uR/hr}$	Level D	Normal monitoring during sampling procedures
$100 \text{ uR/hr} < x < 200 \text{ uR/hr}$	Level D	Periodic monitoring (every 30 minutes)
$200 \text{ uR/hr} < x < 2 \text{ mR/hr}$	Level D	Continuous monitoring - worker exposures assessed
$x > 2 \text{ mR/hr}$		Work area evacuated and contact the HSO or Arthur D. Little's Radiation Safety Officer (RSO)

5.3 Emergency Equipment

Arthur D. Little will provide fire extinguishers, first aid kits, portable eyewash units and other appropriate emergency equipment. See Section 7.8.3 for additional information on emergency policies, procedures, materials, supplies and equipment.

6.0 Background, Site Location, and Site Description

6.1 Background

Camp Devens was established in 1917 as a temporary training camp for soldiers from the New England area. Peak military strength during the World War I era was 38,000. Since that time, it has been an installation of the U.S. Army Forces Command (FORSCOM). In 1929, Camp Devens was designated a summer training camp for several military groups. By 1931, Camp Devens became a permanent post and was renamed Fort Devens. Between 1929 and 1930, it served as the location for test firing of rockets. Between 1931 and 1940, Fort Devens functioned as a training installation.

From November 1940 until May 1946, Fort Devens provided an induction center for an estimated 650,000 people in response to World War II. At the close of World War II, Fort Devens served as a demobilization center and was subsequently placed on caretaker status. It was again used as an induction and training center during the Korean and Vietnam conflicts.

Currently, the mission of Fort Devens is to command and train its assigned duty units and to support the U.S. Army Security Agency Training Center and School, U.S. Army Reserves, Massachusetts National Guard, Reserve Officer Training Programs, and Air Defense sites in New England. No major industrial operations occur at Fort Devens, although several small-scale industrial operations are performed under 1) the Directorate of Plans, Training, and Security; 2) the Directorate of Industrial Operations (DIO); and 3) the Directorate of Engineering and Housing (DEH). The major waste-producing operations performed by these groups are photographic processing and maintenance of vehicles, aircraft, and small engines.

As a result of the Base Realignment and Closure (BRAC) Act of 1990, Fort Devens has been designated as a BRAC 91 installation. The on-going Installation Restoration Program will be supplemented by environmental restoration activities in preparation for base closure; these activities will meet the requirements of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) of 1980 and Superfund Amendments and Reauthorization Act (SARA) of 1986.

6.2 Site Location and Description

Fort Devens is located in Worcester and Middlesex Counties, approximately 40 miles west of Boston, Massachusetts, in the vicinity of the town of Ayer (Figure 6-1). The installation includes portions of the towns of Ayer, Harvard, Lancaster, and Shirley. In 1917, approximately 11,000 acres were leased to establish Camp Devens. Between

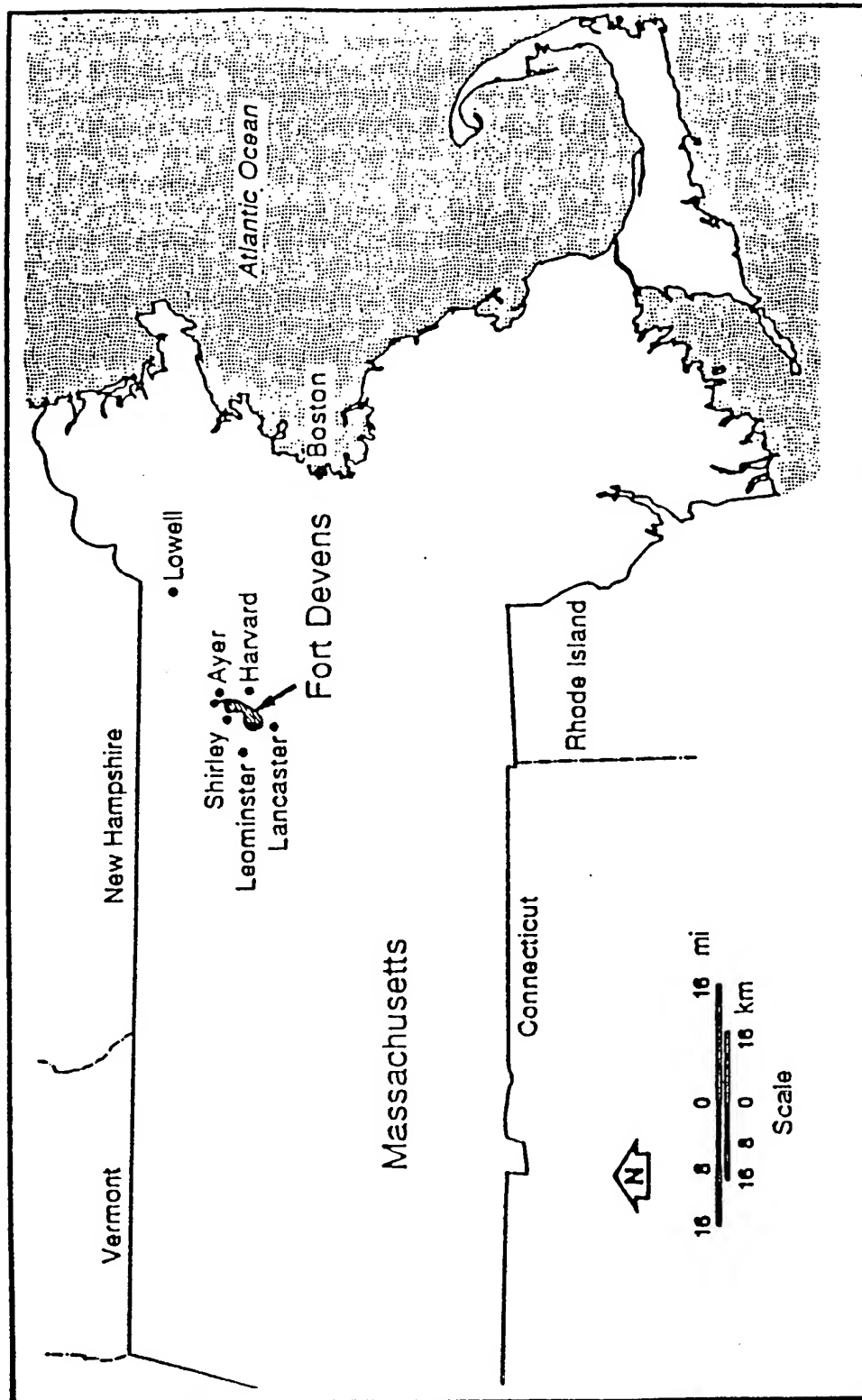
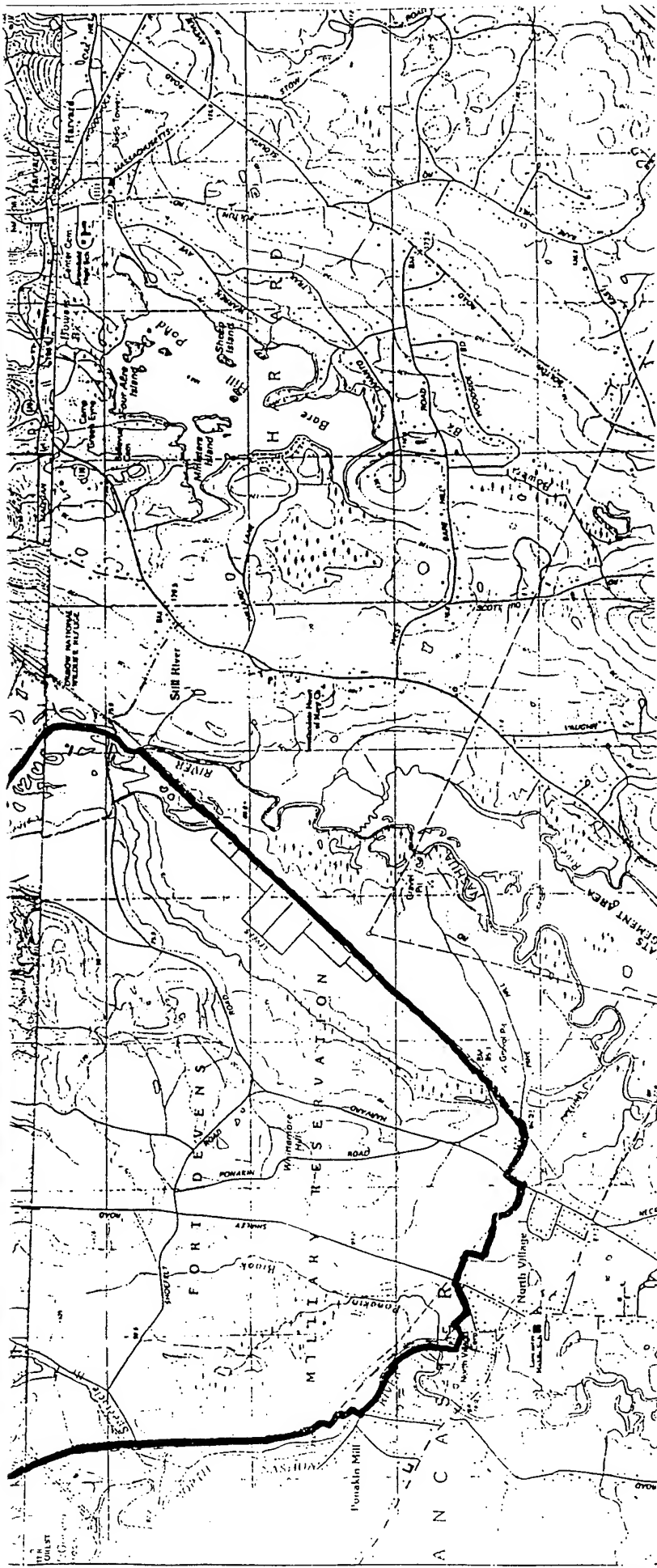


Figure 6-1: Location of Fort Devens in Massachusetts (Source: Adapted from McMaster et al. 1982)







PREPARED FOR:

USAEC

DATE:

JAN. 1993

SCALE:

1:25000

DWG. NO.:

BORDER.DWG

SOURCE: USGS TOPOGRAPHIC 7.5-MINUTE SERIES;
AYER, MASSACHUSETTS, 1988, AND
HUDSON, MASSACHUSETTS, 1988

TITLE: Figure 6-2:

REGIONAL SETTING OF FORT
DEVENS

Health and Safety Plan:Fort Devens
Section No.: 6.0
Revision No.: 1
Date: June 16, 1993

1919 and 1923, approximately 4,900 acres were purchased. In June 1940, Fort Devens received permission to acquire more land, and, by 1941, the total land area increased to 10,163 acres. Figure 6-2 shows the regional setting of Fort Devens.

Since 1955, various land parcels, ranging in size from one to 662 acres, have been exsessed by Fort Devens. The more recent transactions included the 662 acres for the Oxbow National Wildlife Refuge, exsessed in 1972 to the Department of the Interior; 76.5 acres deeded to the Town of Ayer in 1978; and an additional 57.26 acres, exsessed in 1988. Fort Devens currently covers approximately 9,280 acres, consisting of the Main, North, and South Post areas. Massachusetts Highway 2 crosses Fort Devens and separates the Main Post from the South Post.

The majority of the facilities at Fort Devens lie within the Main Post, located north of Massachusetts Highway 2. The Main Post provides all of the on-post housing, including over 1,700 family units and 9,800 bachelor units (barracks and unaccompanied officers' quarters). Other facilities on the Main Post include community services (e.g. the shoppette, cafeteria, post exchange, bowling alley, golf course, and hospital), administrative buildings, classroom and training facilities, maintenance facilities, and ammunition storage.

The terrain surrounding Fort Devens includes rolling areas and wooded hills. Fort Devens is located in the Nashua River Basin, and approximately 8 miles of the river, running from south to north, lie within the reservation boundaries (Figure 6-2). One lake and several ponds are located within Fort Devens. Land surface elevations within Fort Devens range from about 200 feet above mean sea level (MSL) along the Nashua River on the northern boundary to 450 feet above MSL in the southern portion of the installation.

6.3 Site-specific Actions

See Supplements to the Health and Safety Plan.

The site-specific health and safety plans, provided in the attached Supplements contain detailed information on the site-specific activities (e.g., soil sampling, wipe sampling etc.) to be conducted at each area. Additional information is provided in the Work Plans.

7.0 Health and Safety Procedures

7.1 Site-Specific Health and Safety Plan

Due to the size of the Fort Devens facility and the diversity of the study areas, site-specific health and safety plans have been developed. Site-specific plans for each of the study areas are provided in the attached Supplements.

7.2 Work Zones and Site Control

The purpose of the site control measures discussed in this section are to maintain order at the site and to minimize chemical and physical hazards to onsite personnel, visitors, and the public. Only personnel identified as "authorized" will be permitted to enter the site. A master list of authorized personnel will be available and will only include personnel who have received the appropriate training and medical certification required by this HASP and OSHA requirements.

7.2.1 Work Zones

Work zones are designed to prevent employees, visitors, and the surrounding environment from exposure to contamination during all aspects of site investigation activities. All work zones and support areas will be established by Arthur D. Little. Movement of personnel and equipment between zones and on and off the site will be controlled by means of designated access points. Minimum personal protective equipment (PPE) for work in each zone is described in Section 7.0.

7.2.2 Exclusion Zones

During select onsite operations, the SHSO may determine that it is necessary to establish and maintain Exclusion Zones. The Exclusion Zones may be marked using plastic caution tape supported by metal or wood stanchions, safety cones and flagging tape, or other equivalent demarcation methods. The Exclusion Zone encompasses the surface areas within a 50-ft radius around the location of drilling operations. A formal exclusion zone may not need to be established for other planned operations; however, steps must be taken to ensure that personnel and equipment are properly decontaminated and that contaminated materials are not removed from the work area.

The SHSO will be responsible for coordinating the prohibition of non-essential personnel within the Exclusion Zone boundaries. Prior to entering the Exclusion Zone, site personnel shall have donned the proper personal protection equipment (PPE) for expected site conditions and the particular operation, as determined by the SHSO.

7.2.3 Contamination Reduction/Decontamination Zones

The Contamination Reduction Zone will be established as a buffer zone between the Exclusion Zone and the Support Zone of each drilling site. All personnel and equipment leaving the Exclusion Zone will do so through the Contamination Reduction Zone. The personnel and equipment decontamination stations will be located in this zone.

Contamination Reduction Zones, or decontamination zones, shall be established adjacent to the Exclusion Zones. Personnel exiting the Exclusion Zones shall undergo appropriate decontamination activities as directed by task-specific procedures.

7.2.4 Support Zone

The Support Zone will be established near the site entrance. No special clothing or protective equipment, except hard hats and leather or chemically-resistant boots with steel toes, is required in this area. Operational and support facilities (supplies, equipment, storage, and maintenance areas) will be located in this area. No equipment or personnel will be permitted to enter the Support Zone from the Exclusion Zone without removal of all potentially contaminated PPE.

A field station shall be established at the site in a space provided by Fort Devens. Fort Devens will provide all power and office facilities.

7.2.5 Site Entry and Exit

All persons entering an Exclusion Zone will be required to wear the PPE specified in the site-specific health and safety plan.

The following protocols will be followed when leaving the Exclusion Zone and Contamination Reduction Zone:

- All personnel will exit through the designated exit points.
- All personnel will proceed through appropriate decontamination.

All protective equipment will be removed in the Contamination Reduction Zone.

7.2.6 Site Access and Parking

No personal vehicles are to travel beyond the van used as the base of operations to help accomplish work tasks. Other vehicles should not be driven on the site unless necessary and approved by the Project Field Supervisor.

7.2.7 Buddy System

All work operations will be scheduled so that no employee works alone onsite at any time. Each worker will maintain visual contact with another specified worker at all times. The buddy system will ensure against an employee becoming stressed, ill, or

injured without a co-worker being aware of his or her condition. Workers must "watch out" for each other while working close to potential chemical and physical hazards.

7.3 Environmental Monitoring

From a general standpoint environmental monitoring is discussed in Section 5.2 of this plan. Site-specific monitoring requirements are provided in each of the site-specific plans contained in Appendix D of the attached Supplements.

7.4 Safe Work Practices

7.4.1 General

Safe work practices, which must be followed by all site workers, include, but are not limited to, the following:

- Eating, drinking, chewing gum or tobacco, and smoking are strictly prohibited in the Exclusion and Contamination Reduction Zones and in the vicinity of all work operations. Break areas will be designated by the SHSO for these activities.
- Do not sit or kneel in areas of potential contamination.
- Hands and face must be thoroughly washed upon leaving the work area. Good personal hygiene is imperative.
- Immediately repair or replace any defective PPE.
- Prescription drugs must not be taken by personnel unless specifically approved by a qualified physician.
- Personnel onsite must use the buddy system; visual contact must be maintained between team members at all times.
- Report any unsafe conditions and accidents immediately to the SHSO.

7.4.2 Daily Start-up and Shutdown Procedures

The following protocols will be followed daily prior to start of work activities:

- The SHSO will review site conditions to determine if modification of work and safety plans are needed.

- Personnel will be briefed and updated on any new health and safety procedures as well as emergency information.
- All safety equipment will be checked for proper function.
- The SHSO will ensure that first aid and other emergency equipment is readily available.
- The SHSO will initiate appropriate monitoring.

The following protocol will be followed at the end of daily operations and before breaks:

- All personnel will proceed through decontamination procedures and facilities, as appropriate.

7.4.3 Confined Space Entry

Arthur D. Little will be prohibited from conducting confined space entry during this project. If onsite activities warrant entry into confined spaces a qualified subcontractor will be retained.

7.4.4 Tanks, Drums, and Barrels

It is possible that buried tanks, drums or barrels could be discovered. However, should the field investigations discover or detect unknown tanks, drums, barrels or other containers that are suspected of containing hazardous waste, the following procedures will be followed. Field personnel should mark this location with flagging tape or some similar means and should also mark this location on the site plans. Field personnel should not stay in the immediate area (100 foot radius) any longer than is needed to flag the location of the discovered object. Tanks, drums and barrels are to be left undisturbed until an action plan and an addendum to the HASP have been approved by the ADL Project Manager, the Health and Safety Officer, and the USAEC Project Manager.

7.4.5 Accident Prevention Plan

Arthur D. Little's Accident Prevention Plan is provided in Appendix C. This plan addresses several aspects of general site safety, including training, sanitation, fire prevention, housekeeping, protective equipment, equipment maintenance, and site inspections. The provisions of this plan must be adhered to by all onsite personnel and subcontractors.

7.5 Site Entry Procedures

All vehicles will check in at the gate daily unless otherwise specified by Fort Devens. Vehicles used for transport onsite will use a pass obtained from Fort Devens for access on the facility. After the morning health and safety briefing, communications systems will be checked, and personnel will inspect and done their appropriate level of protection.

7.6 Decontamination

7.6.1 Exclusion and Decontamination Zones

In recognition of the increased risk to workers of physical injury and exposure to chemical contaminants, Exclusion Zones may need to be established and maintained. Non-essential personnel shall be prohibited from entering these Exclusion Zones. All personnel entering the Exclusion Zones will be required to wear appropriate personal protective equipment and as approved by the SHSO for the particular task.

A Decontamination Zone shall be established adjacent to the Exclusion Zones, and shall consist of wash tubs, a garden-type, pressurized water sprayer, soap and brushes to be used for removing soils and other contamination from gloves and boots.

7.6.2 Decontamination Procedures

Upon leaving the designated Exclusion Zones, all personnel must undergo appropriate decontamination. The nature of the decontamination requirements will depend on whether immediate re-entry into the Exclusion Zone is planned, or if complete egress from the Exclusion Zone is intended. The extent of decontamination will be decided by the SHSO. The decontamination requirements will also depend on the level of protection used within the Exclusion Zone and the degree of contamination.

Contamination avoidance procedures shall be practiced at all times. The Decontamination Zone will be located immediately outside the access opening of the Exclusion Zones on its apparent upwind side, and will be delineated using caution tape and/or stakes, metal stanchions, or traffic cones. This zone shall contain the decontamination stations necessary to allow rest and beverage breaks and respirator cartridge changes, as well as complete decontamination as required to exit the work area. Beverages (e.g., bottled water) will be provided to personnel adjacent to this area during rest breaks.

The decontamination area will consist of outer glove and boot wash and rinse stations, and a disposal drum. Decontamination wash will be accomplished by dispensing a detergent and water solution from a garden-type pump-spray can, or similar device. The wash shall be followed by a rinse with clean water. Brushes will be supplied for assisting in the removal of solids.

7.6.2.1 Partial Decontamination. Workers must observe the following personnel decontamination procedures prior to respirator cartridge changes or rest breaks in the decontamination area:

For Modified Level D and Level C

1. Wash outer gloves.
2. Remove wrist tape (as applicable) and dispose into a plastic-lined disposal drum.
3. Remove outer gloves and dispose into a plastic-lined disposal drum. Continue procedures below, as appropriate.

To change respirator cartridges only

4. Remove respirator, change cartridges, clean respirator with respirator wipe, and put respirator back on.
5. Make sure cartridges are properly seated against the gaskets. Fit check the respirator by holding palms over the cartridges and inhaling (negative pressure fit check). If the respirator is properly seated, air cannot be drawn through the respirator in this fashion.
6. Put on clean outer gloves.
7. Tape wrists with duct tape.
8. Re-enter Exclusion Zone.

For rest breaks

1. Wash outer gloves.
2. Remove wrist tape and dispose into a plastic-lined disposal drum.
3. Remove outer gloves and dispose into a plastic-lined disposal drum. Continue procedures below, as appropriate.
4. If respirator is being used, remove respirator and place in a clean area.
5. Remove inner gloves, dispose into disposal drum.
6. Wash hands and face at wash station. Dry hands and face with paper towels.

7. Take rest break, drink water from disposable paper cups.
8. Put on glove liners.
9. If respirators are being used put on respirator.
10. Don outer gloves.
11. Tape wrists.
12. Re-enter Exclusion Zone.

If, in the opinion of the SHSO, Tyvek jumpsuits or outer boots are severely contaminated, then full decontamination must be performed for rest and beverage breaks. The SHSO will determine the necessary decontamination status.

7.6.2.2 Complete Decontamination. For complete decontamination prior to leaving the site, all personnel must observe the following procedures upon leaving the Exclusion Zone:

1. Get hands and feet screened with a radioactive detector if radiation monitoring program is in effect (see Section 5.2.10.4).
2. Place contaminated sampling and other associated equipment into plastic bag(s) and seal with duct tape.
3. Wash and rinse outer boots and outer gloves.
4. Remove ankle and wrist tape and dispose of in a plastic-lined disposal drum.
5. Remove outer boots. Outer boots used on-site are not to be taken off-site. All footwear will be dedicated to site work only.
6. Remove outer gloves and dispose of in a plastic-lined drum.
7. Remove Tyvek suit and dispose of in a plastic-lined drum (if applicable).
8. If using a respirator, remove respirator, dispose of cartridges, wash, disinfect, dry and place respirator in a clean plastic bag.
9. Remove and dispose of under gloves.
10. Exit the Decontamination Zone.

7.6.3 Decontamination Notice to Emergency Personnel

Base emergency medical personnel and ambulance crews will be notified by Arthur D. Little before operations begin. They will be advised and warned of the possibility of having to handle contaminated clothes and/or injured workers, and they will be advised of appropriate decontamination procedures.

7.6.4 Equipment Decontamination

All equipment being used in the Exclusion Zone will be subject to complete decontamination procedures before the equipment is removed from these work areas. Equipment and vehicles which contact potentially contaminated soil will be decontaminated using a detergent solution and a steam cleaner or hot water pressure washer. All contaminated items will be carefully inspected and/or decontaminated to the satisfaction of the SHSO before being taken off-site.

7.6.5 Disposal of Wastes During Investigative Activities

Waste solids generated by the investigative activities (including used respirator cartridges and disposable protective coveralls) will be drummed, labeled, and stored on-site for disposal as hazardous wastes. Suspect hazardous waste fluids generated during drilling activities will also be containerized in 55-gal drums and stored in the Contamination Reduction Zone for testing, pick-up and disposal by Fort Devens personnel. The Supplemental Work Plan contains further information on the sampling and analysis of waste by-products generated during the investigation.

All handling of drummed drill cuttings, drill fluids, development water, decontamination fluids, and protective clothing will be conducted using a suitable material handling device such as a two wheeled drum dolly and good lifting and drum handling methods. If materials have to be moved a distance and/or are extremely heavy, mobile equipment such as a forklift equipped with a chime hoist shall be used and operated only by trained and qualified personnel. This type of movement may have to be coordinated with Fort Devens Base Services.

7.7 Communications and Equipment

Communication onsite, including into or out of the Exclusion Zone, will generally be accomplished by voice; however, walkie-talkie devices will be available during onsite activities. If more than two persons require or request the use of the walkie-talkies for the same day then the site supervisor shall resolve who has priorities, provide additional communication devices, reschedule one or more tasks, or otherwise resolve this situation to the satisfaction of interested parties and the SHSO. Prior to conducting work in a particular area, the Project Field Supervisor will locate the nearest telephone and instruct all personnel regarding its location. A cellular telephone(s) will also be available onsite for the sole purpose of emergency notification.

7.8 Emergency Action Plan

On-site emergencies will ultimately be handled by installation emergency support personnel. The initial aspects of an emergency response and first-aid treatment, however, will only be performed by qualified Arthur D. Little personnel.

7.8.1 Pre-Emergency Planning

Prior to the start of work, Arthur D. Little will work with Fort Devens representatives to contact applicable local authorities and inform them of the start date and anticipated scope of work.

First-aid kits and at least two Arthur D. Little employees trained in first aid and cardiopulmonary resuscitation (CPR) will be on-site at all times during investigative activities.

7.8.2 Emergency Recognition and Prevention

Emergency conditions that may be anticipated at the site include:

- Medical emergency;
- Heavy equipment accidents;
- Discovery of unanticipated buried hazards;
- Explosions and fires; and
- Heat stress/cold stress.

To ensure that hazard recognition and accident prevention protocols are being maintained, personnel must follow the requirements of the HASP.

7.8.3 Emergency Equipment

Select pieces of equipment will be provided by Arthur D. Little. Emergency equipment for the Exclusion Zone will be kept in the Contamination Reduction Zone or the Support Zone. At a minimum, the equipment must include:

- Portable emergency eye wash system(s) meeting American National Standard ANSI Z358;
- Multipurpose (ABC-rated) fire extinguishers;
- Adequately stocked first-aid kits;
- Air horns; and
- Mini-spill containment kits.

7.8.4 Operations Shutdown

The SHSO has the authority to shut down work operations if, in his/her professional judgment, significant health and safety issues arise. Operations shutdown may also be mandated by the Project Manager or the Site Manager on recommendation from the SHSO. Conditions warranting work stoppage will include:

- Uncontrolled fire.
- Uncovering potentially dangerous buried material, including chemical agents or explosives.
- Heat stress illness exhibited by the crew.
- Personal exposures or accidents.
- Air containment concentrations in excess of the protection factors afforded by the respirators in use.

When any of these conditions exist, operations will be stopped and the site secured. All personnel will leave the work area until the Emergency Coordinator and the SHSO have determined that operations may resume.

7.8.5 Fire and Explosion Response Procedures

Fires on-site can be started by natural events, work activities, or the activities of others. In the event of a fire or explosion, the base fire department shall be immediately notified. All personnel shall move to a safe distance based on the severity of the fire. Fires shall not be fought by Arthur D. Little personnel if an explosion hazard is present. Personnel should not attempt to fight large fires at the site. In case of small fires which could possibly occur, Arthur D. Little will have multipurpose (ABC-rated) fire extinguishers on hand at all times. Personnel have been previously instructed in the use of these fire extinguishers and will attempt control of only very small fires (e.g., ones which will require one extinguisher). The procedure for using a fire extinguisher is to pull the safety pin, point the extinguisher at the base of the flames, and discharge the extinguisher by sweeping the flames from a distance of about six feet. The extinguisher operator should move in as the flames are being put out. In the event of a larger or uncontrolled fire, all personnel will immediately evacuate the area and the Emergency Coordinator or the SHSO will notify and work with the base fire department.

7.8.6 Spills, Releases, Leaks of Hazardous Materials

In case of a hazardous materials emergency, the on-site Field Supervisor will assume full control and direction of the emergency as the Emergency Coordinator. The Emergency Coordinator will work with the SHSO to identify and evaluate the hazards. All emergency responders and communications will be coordinated and controlled through the Emergency Coordinator. When installation emergency response personnel arrive on-site, the Emergency Coordinator shall brief responding installation personnel (e.g. fire department) and relinquish control of the scene to the chief or designated Incident Commander.

The Arthur D. Little staff will not be organized as a formal Emergency Response Team per HAZWOPER and will only perform defensive containment measures and activities that do not pose a threat to their own health and safety (e.g., incidental releases only). Situations which pose a serious threat to the public health or the

environment will be dealt with by notifying the Fort Devens Post Fire Department, the USAEC Project Manager, the Arthur D. Little Project Manager, the Arthur D. Little HSO, and the appropriate state and local authorities. All spills, regardless of size, should be reported to the SHSO.

7.8.7 Evacuation from Work Zones

Based on the specific work area, the evacuation site will be chosen (i.e., based on wind direction, severity and type of incident) by the SHSO in concert with Fort Devens emergency representatives and made known to all site workers during the daily pre-entry briefing.

In the event of an emergency that requires workers to evacuate the site or an area of the site, at least one of the following signals will be given - verbal communication, communication via walkie-talkie, or three blasts on an air horn or vehicle horn. If there is imminent danger anyone may give the evacuation signal. When a site emergency occurs and the evacuation signal is given, the work will be shut down, and all employees will leave the work area. It is the responsibility of individuals to evacuate in a calm, controlled fashion. Use the evacuation route that affords the most direct route away from the site area while avoiding the emergency area. Any changes to suggested evacuation routes provided in the Site Specific Health and Safety Plans will require the SHSO to hold a Health and Safety Briefing to advise all site personnel of the change. An updated evacuation map will be posted at the field station and in other areas as appropriate.

In case of emergency, evacuated employees may be decontaminated rapidly by removing exterior clothing. If a worker is critically injured in the Exclusion Zone, the worker may be removed immediately from the area -- DO NOT take time to decontaminate an injured worker; seek medical attention immediately.

The Field Supervisor's log of on-site personnel will be used to ensure that all individuals are present (e.g., head count). If someone is missing, the SHSO will alert the appropriate emergency personnel listed below. Control of personnel at the rendezvous point is the responsibility of the Field Supervisor or his/her designated assistant.

7.8.8 Emergency Telephone Numbers

The name and phone numbers of all personnel and agencies that could be involved in emergency response will be posted by the telephone in the field office and maintained in each vehicle. The following phone list contains the agencies and individuals to be notified in an emergency.

Fire Departments

Fort Devens: (508) 796-2220 (Fire/HazMat Response)
Local: (508) 772-2657

Police

Fort Devens: (508) 796-3333
Local: (508) 772-21212

Explosives/Ordnance

14th Ordnance Detachment

Ambulance/Hospital

Cutler Army Hospital (Bldg 3654): 796-6911
Nashoba Community Hospital 200 Groton Road: 772-2657

Other Important Numbers

Fort Devens Environmental Coordinator - Jim Chambers: (508) 796-3114
Fort Devens Health and Safety Coordinator - Rick Theopold: (508) 796-2441
USAEC Contracting Officer's Representative - Charles George: (410) 671-1625

USAEC Safety Officer - William P. Houser: (410) 671-1591

State of Massachusetts DEP, Central Region, Bureau of
Waste Site Cleanup: (508) 792-7653

USEPA Region I, Oil and Hazardous Material Spills
Emergency Response: (617) 860-4363/4364

Arthur D. Little, Inc.
(See Delivery Order Specific Supplement)

Written directions from the various worksites to the hospital are provided in Table 7-1. A map will be posted onsite which indicates the location of the base hospital (Cutler Army Hospital) with respect to the various site work areas.

Table 7-1: Site-Specific Directions to Cutler Army Hospital

Site #33 DEH Entomology Shop (Bldg 262). Go south on Buena Vista to second stop sign (Dakota). Turn right on Dakota and take second left onto Queenstown Street. Hospital is on the left off Queenstown Street.

Site #34 Former DEH Entomology Shop at Bldg 245. Go south on Buena Vista to second stop sign (Dakota). Turn right on Dakota and take second left onto Queenstown Street. Hospital is on the left off Queenstown Street.

Site #35 Former DEH Entomology Shop at Bldg 254. Go south on Buena Vista to second stop sign (Dakota). Turn right on Dakota and take second left onto Queenstown Street. Hospital is on the left off Queenstown Street.

Site #36 Former DEH Entomology Shop at Bldg 272B. Go south on Buena Vista to second stop sign (Dakota). Turn right on Dakota and take second left onto Queenstown Street. Hospital is on the left off Queenstown Street.

Site #37 Golf Course Entomology Shop (Bldg 3622). Turn right onto Patton Road and first right onto Queenstown Street. Hospital is on the left.

Site #16 Shoppette Debris Disposal Area. Follow Patton Road until Queenstown Street appears on left. Take a left onto Queenstown Street. Hospital is to the left.

Site #17 Little Mirror Lake. (Follow Site #16, or) Follow Sheridan Road to Queenstown Street. Take a right onto Queenstown Street. Hospital is on the right.

Site #29 Transformer Storage Area. Follow Saratoga Street to Patton Road. Take a right onto Patton Road and a left onto Queenstown Street. Hospital is on the left.

Site #39 Transformer Near Bldg. 4250. Come back under Route 2. Take left onto Sheriden Road and a right onto Queenstown Street. Hospital is on the right.

Site #10 Construction Debris Area #1. Follow Perimeter Road until it intersects with Hospital Road. Turn left onto Hospital Road and then turn right on Givry Street. Take a right onto Jackson Road and turn left onto Patton Road. Bear right onto Sheridan Road and a right onto Queenstown Street. The hospital is on the left.

Site #11 Construction Debris Area #2. East on Lovell Street until it intersects with Hospital Road. Turn left onto Hospital Road and then turn right on Givry Street. Take a right onto Jackson Road and turn left onto Patton Road. Bear right onto Sheridan Road and a right onto Queenstown Street. The hospital is on the left.

Nashua River Study. Follow Perimeter Road until it intersects with Hospital Road. Turn left onto Hospital Road and then turn right on Givry Street. Take a right onto Jackson Road and turn left onto Patton Road. Bear right onto Sheridan Road and a right onto Queenstown Street. The hospital is on the left.

7.8.9 Reporting Incidents

7.8.9.1 Large-Scale Incidents. In the event of an environmental incident, installation emergency response personnel at the Base Fire Department shall be notified immediately. Initial evacuation of the area in question should be accomplished by the Field Supervisor and the SHSO. Additionally, Arthur D. Little's HSO and Corporate Health and Safety Director (CHSD), and the USAEC Safety Officer should be notified as soon as possible. Emergency first aid shall be applied on-site as deemed necessary. The injured/ill individual will then be decontaminated (if necessary) and transported to the base hospital, if needed. The hospital ambulance personnel will be contacted for transport as necessary in an emergency.

7.8.9.2 Accidents, Injuries, Illnesses. In the event of an accident involving personal injury or illness the SHSO or Field Supervisor will contact the base hospital immediately. The SHSO or the Field Supervisor will arrange for administration of appropriate first aid, and arrange transportation for injured personnel to the hospital. The SHSO will evaluate the site conditions to determine if the causal hazard still exists. Site personnel shall not reenter the Exclusion Zone until the cause of the injury is determined and the Exclusion Zone is designated safe to re-enter by the SHSO.

As soon as practical after an emergency response, the SHSO or the Field Supervisor shall brief the Task Manager, and the HSO as to the nature of the incident and response actions taken. The SHSO, with the assistance of the HSO and Arthur D. Little's health and safety support staff, shall evaluate the site conditions and make a determination regarding any measures that could be taken to prevent incidents of this nature from being repeated.

All incidents shall be reported on the appropriate Arthur D. Little Accident Investigation Report form. The Field Supervisor must ensure that a copy of the Accident Investigation Report is submitted to the Cambridge office within 24 hours of the incident. The following additional elements are required to be reported by USAEC:

- Time of incident;
- Estimation of property damage;
- Nature of damage, including effect on production, operations, or other activities;
- Other damage or injuries sustained (public or private);
- Whether a release was made to the news media (Arthur D. Little field personnel **must not** speak with reporters. All inquiries must be referred to Fort Devens personnel); and
- Any indication of sabotage or espionage.

A copy of the accident report will be forwarded to the designated USAEC Safety Officer.

Accidents resulting in a fatality, lost-time injury or illness, hospitalization of five or more personnel, or property damage to government or contractor property (which occurred during the performance of the contract) equal to or exceeding \$2,000.00 must be telephonically reported to USAEC, SES Branch, (410) 671-4811, as soon as possible, but not later than two hours after occurrence and reported in writing within five days of occurrence on DA Form 285 (see Attachment F). All other accidents/incidents must be telephonically reported to USAEC, SES Branch, (410) 671-4811, within eight hours of occurrence.

7.9 First Aid Emergency Procedures

7.9.1 Chemical Exposures

Inhalation

1. If site personnel experience symptoms suggesting overexposure to toxic chemicals (lightheadedness, dizziness, headache, nausea, shortness of breath, burning sensation in the mouth, throat, or lungs), the person should be escorted from the contaminated environment to fresh air immediately.
2. If unconscious, the victim should be removed from the contaminated area immediately and brought to the nearest hospital. Rescuers shall wear appropriate personal protective equipment during rescue.
3. If the victim is no longer breathing, he or she shall be moved away from the contaminated area. Mouth-to-mouth resuscitation or some alternate form of effective artificial respiration shall begin immediately.
4. If the victim has no pulse he or she shall be moved away from the contaminated area, and cardio-pulmonary resuscitation (CPR) should begin immediately. It may be necessary for the victim to receive artificial resuscitation and CPR simultaneously.

Should any of the above scenarios be encountered, emergency medical attention and advice must be immediately sought by contacting the Cutler Army Hospital.

Skin Exposure

If there is skin contact with toxic or potentially toxic chemicals, the skin should be washed with copious amounts of clean water for at least 15 minutes. If clothing is contaminated, it should be removed immediately and the skin washed thoroughly with running water.

All contaminated parts of the body, including the hair, should be thoroughly washed. It may be necessary to wash repeatedly. Seek medical attention as appropriate.

Ingestion

If site personnel should ingest toxic or possible toxic chemicals, obtain medical attention immediately.

Eyes

If a substance should get into the eyes, they should be washed with generous amounts of water. The eye should be flooded with water so that all surfaces are washed thoroughly. Washing should be continued for at least 15 minutes. Medical attention should be obtained immediately thereafter.

8.0 Site Hazard Summary

Hazards which may be encountered at this site can be classified into three general categories: chemical and radioactive, physical, and environmental hazards. Chemical and radioactive hazards are site specific and involve the potential exposure to chemical contaminants in soil and ground water. Physical hazards are generally occupationally-specific and may involve some type of accident, exposure to noise, electrical hazards, etc. Environmental hazards are created by natural environmental circumstances such as weather, poisonous plants, poisonous animals, insect bites, etc. To minimize the likelihood of an accident, onsite personnel should be familiar with the Accident Prevention Plan in Appendix C.

8.1 Unexploded Ordnance (UXO)

There is a potential to encounter unexploded ordnance at several sites during this project. In areas where UXO is anticipated, locations of intrusive activities must be cleared prior to the initiation of work.

UXO clearance will be performed at the surface prior to drilling and at four foot intervals during completion of the borings. If the review of records or site inspections conducted during the pre-drilling visit indicates the potential for UXO at other study areas, UXO clearance procedures will also be completed at these locations prior to intrusive activities. The procedures for UXO clearance are provided in the UXO Subcontractor's procedures for Clearing Borings and Monitoring Well Locations, included in Appendix E.

Proposed investigation locations will be moved if the UXO clearance team encounters UXO.

No UXO operations will be conducted during the hours between sunset to sunrise, or during electric storms or severe weather conditions. Additionally, no UXO operations will be conducted if severe weather conditions are imminent.

All UXO operations will be conducted in accordance with the UXO contractor's Health and Safety Plans and Procedures, included in Appendix E.

8.2 Chemical and Radioactive Hazards

The primary contaminants of concern for ground water, surface water, and soils are listed in each of the site-specific health and safety plans. Contaminants of concern were selected based on their toxicity and the concentrations which have previously

been detected or are anticipated at the site. Several known or suspect carcinogens are included in these tables. The materials and concentrations listed do not necessarily reflect current conditions across the site. In addition, it is very likely that not all sources of contamination have been identified at this site.

A general radiation survey will be performed at each work site to determine if radioactive materials are present at levels requiring special health and safety procedures. This requirement will be waived for document review, interview, and site tour activities.

8.3 Physical Hazards

All Arthur D. Little, subcontractor, and other site personnel may be subject not only to the hazards of contaminant exposure, but also to physical dangers posed by on site activities.

The physical hazards expected to be present at the sites during investigative activities include:

- Irregular work surfaces (footing);
- Snapping cables, slings, and rope;
- Drilling equipment;
- Moving equipment and vehicles;
- Sharp objects;
- Open pits or ditches;
- Excessive noise;
- Fire;
- Buried utility lines and systems;
- Slips, trips, falls; and
- Improper lifting of heavy objectives.

8.3.1 Abatement of Physical Hazards

Most of the physical hazards identified above will be abated through the use of safe work practices and uncommon sense. Some of these hazards, however, require special precautionary procedures which are discussed below.

8.3.2 Fire/Explosion

Whenever site work involves disturbance of hydrocarbon contaminated soils the potential for a fire/explosion may be present. The primary sources of flammable gases/vapors are:

- Methane, a by-product of the decay of organic material; and
- Vapors from volatile organic compounds in the soil.

During most operations, periodic monitoring of flammable vapors/gases using a combustible gas indicator/oxygen meter will alert site workers to the presence of dangerous concentrations of these contaminants. Air monitoring requirements for combustible gases are delineated in Section 5.0 of the HASP.

ABC fire extinguishers will be provided to personnel onsite. All personnel have been trained in their use. The emergency response aspects of fire suppression are included in Section 7.0 of the plan.

8.3.3 Buried Utility Lines

Fort Devens Engineering staff members will be contacted prior to any drilling or excavation activity to ascertain the presence and location of underground cables, utility lines, pipes and storage vessels at the proposed sites. Utility maps will be reviewed to determine the presence of any of the above mentioned underground hazards.

Additionally, drilling locations will also be screened for underground hazards using a Ground Penetrating Radar (GPR) survey prior to the commencement of intrusive activity.

8.3.4 Drilling

If the noise levels are likely to exceed 85 dBA for any portion of the drilling, hearing protection will be required to be worn by all personnel working in the area during this operation.

As stated above, the selection of locations for each monitoring well drilling activity site and sampling site will take into account buried utility pipes lines, wires, conduits, and tanks, or other potentially dangerous structures, and military supplies. Overhead power lines and obstructions will also be surveyed. Prior to raising the mast, the area overhead and surrounding the rig will be checked by the drilling foreman and the SHSO. No drilling will be conducted within 50 ft of an overhead power line or obstruction.

When rotary drilling/sampling, drill rods will not be racked more than 1 1/2 times the height of the mast. During the drilling operations and rig setup and takedown, all persons who enter the Exclusion Zone will wear hard hats, safety shoes/boots, protective coveralls, and safety glasses/face shields to protect personnel from the physical hazards. Respiratory protection may be required based on area and personnel monitoring.

If during drilling there is any indication that underground tanks, drums, or other containers are being encountered, the drilling will be halted immediately and the SHSO notified. Indications that a waste container may have been encountered include

(1) change in the speed or momentum of the auger, (2) visual examination of auger cuttings, (3) odor noted in the cuttings, and/or (4) the presence of airborne total volatile organics as measured with a direct-reading instrument.

8.3.5 Sampling

Preservatives will be added to the samples in the field and the possibility exists for direct contact with potentially hazardous substances; therefore, PPE must be worn as directed in the site-specific plan. Material Safety Data Sheets (MSDS) will be maintained onsite for all hazardous materials utilized. All chemicals shall be handled and stored in accordance with good laboratory practices.

8.3.6 Excavation Safety

All excavation activity will be conducted in accordance with established requirements of 29 CFP 1926.650-.653 and Appendices A-D (Subpart P).

8.3.7 Aquatic Activities

Personnel conducting sampling activities on water bodies will wear USCG-approved personal flotation devices while in boats or on other floating platforms. Chest waders will be needed for non-boat sampling surface water and sediment activities in brooks, streams and other tributaries.

8.4 Environmental Hazards

8.4.1 General

Environmental hazards such as inclement weather, poisonous plants, animals, and insects cannot always be avoided. Based on available information and current site conditions, the Site Health and Safety Officer and field personnel shall use their best judgement to mitigate these potential hazards. Insect/pest, heat stress, and cold stress hazards are the two primary environmental hazards present at the site and are discussed below.

8.4.2 Insect/Pest Hazards

Insects and pests (e.g., ticks, mosquitos, bees, snakes, rats, etc.) are potentially present onsite. The following precautionary measures should be taken based on the nature and severity of the hazard; wear long-sleeved shirts, long pants, and boots that extend above the ankle or socks pulled over the cuffs of pants; tuck pant cuffs into boots; liberally use, per container instructions, any insect repellent containing DEET; wear high, puncture resistant boots; wear light-weight overclothing such as Tyvek pants, jackets, and hoods in the most extreme cases; and tape-up all clothing interfaces. Individuals should also check one another (particularly in hair and around garment interfaces such as wrists, waist, and ankles) for ticks and other insects periodically during the day, and prior to leaving the site. If the use of DEET

containing products is used, special care must be taken to avoid contamination of samples or equipment with DEET.

8.4.3 Heat Stress Hazards

Heat stress of employees can easily occur during these onsite activities. Heat stress indices may be monitored by the Wet Bulb Globe Temperature Index (WBGT) technique. This method will require the use of a heat stress monitoring device, such as the Wibget Heat Stress Monitor (Reuter Stokes).

The WBGT shall be compared to the Threshold Limit Value (TLV) outlines in the ACGIH TLV Manual, and a work-rest regimen will be established, as necessary, according to the WBGT obtained. Note that 5°C must be subtracted from the listed TLV for heat stress to compensate for the wearing of impermeable protective clothing.

Regardless of onsite monitoring, employees are the most knowledgeable regarding the effects of heat on themselves.

One or more of the following control measures need to be used to help control heat stress:

- Provision of adequate liquids to replace lost body fluids. Employees must replace water and salt lost from sweating. Employees shall be encouraged to drink more than the amount required to satisfy thirst. Thirst satisfaction is not an accurate indicator of adequate salt and fluid replacement.
- Replacement fluids will be commercial electrolyte supplements, such as Gatorade or Quick Kick, in combination with fresh, cool water.
- Establishment of a work regimen that will provide adequate rest periods in shaded areas for cooling down. This may require additional shifts of workers.
- Cooling devices such as vortex tubes or cooling vests can be worn beneath protective garments.
- All breaks are to be taken in a shaded, cool rest area (77 degrees Fahrenheit is best).
- Employees shall remove impermeable protective garments during rest periods.
- Employees shall not be assigned other tasks during rest periods.

- All employees shall be informed of the importance of adequate rest, acclimation, and proper diet in the prevention of heat stress.

During periods of high temperature and/or humidity, the Site Health and Safety Officer representative will continually observe the workers for symptoms of heat stress especially in areas where protective clothing is being worn. If the body's physiological processes to maintain a normal body temperature fails, or are overburdened due to excessive heat exposure, a number of physical reactions can occur ranging from mild symptoms such as fatigue, irritability, anxiety, decreases in concentration and movement to death. Additional heat related problems are briefly described below:

- *Heat Rash* - This is caused by continual exposure to heat and humid air, and is aggravated by chafing clothes. Heat rash decreases a person's ability to tolerate heat as well as becoming an irritating nuisance.
- *Heat Cramps* - This is caused by profuse perspiration with inadequate water intake and chemical electrolyte imbalance. Heat cramps result in muscle spasm and pain in the extremities and abdomen.
- *Heat Exhaustion* - Increased stress on various organs to meet increasing demands to cool the body will result in signs and symptoms including shallow breathing; pale, cool, moist skin; profuse sweating; dizziness; and lassitude.
- *Heat Stroke* - This is the most severe form of heat stress which must be treated immediately by cooling the body or death may result. Signs and symptoms include red, hot, dry skin; no perspiration; nausea; dizziness and confusion; strong, rapid pulse; and coma.

In the event of a heat stress related injury or illness, onsite personnel will render the appropriate level of first aid, and, if needed, request assistance from onsite emergency medical personnel and the base hospital.

8.4.4 Cold Stress Hazards

Persons working outdoors in temperatures at or below freezing may experience cold stress and frost bite. Extreme cold for a short time may cause severe injury to the surface of the body, or result in profound generalized cooling, resulting in death. Areas of the body which have high surface-area-to-volume ratio such as fingers, toes, and ears are most susceptible.

Two factors influence the development of a cold injury: ambient temperature and wind velocity. Wind chill is used to describe the chilling effect (on bare skin) of moving air in combination with low temperature. For instance, 10°F with a wind of 15 miles per hour (mph) is equivalent in chilling effect to still air at -18°F.

As a general rule, the greatest incremental increase in wind chill occurs when a wind of 5 mph increases to 10 mph. Additionally, water conducts heat 240 times faster than air. Thus, the body cools suddenly when chemical-protective equipment is removed if the clothing underneath is perspiration soaked.

Local injury resulting from cold is included in the generic term frostbite. There are several degrees of damage. Frostbite of the extremities can be categorized into:

- *Frost nip or initial frostbite* characterized by sudden blanching or whitening of the skin.
- *Superficial frostbite*: skin has a waxy or white appearance and is firm to the touch, but tissue beneath is resilient.
- *Deep frostbite*: tissues are cold, pale and solid; extremely serious injury

Systematic hypothermia is caused by exposure to freezing or rapidly dropping temperature. Its symptoms are usually exhibited in five stages: (1) shivering, (2) apathy, listlessness, sleepiness (sometimes rapid cooling of the body to less than 95°F), (3) unconsciousness, glassy state, slow pulse, and slow respiratory rate, (4) freezing of the extremities, and finally (5) death.

Thermal socks, long cotton or thermal underwear, hard hat liners, or other cold weather gear can aid in the prevention of hypothermia. Blankets, warm drinks (other than caffeinated drinks), and warm break areas are essential. The overall goal is to keep from getting wet. If one does get wet, they should dry off and change clothes.

8.5 Initial and Continued Site Evaluation

A preliminary evaluation will be conducted by the Site Health and Safety Officer to ensure that site activities, personnel protection, and emergency response are consistent with the levels of contaminants expected to be encountered.

Additional data obtained during the course of work will be used to update this evaluation.

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If other contaminants are encountered on site all personnel will be made fully aware of their hazardous properties and the appropriate procedures which will be utilized to prevent exposure.

Appendix A: Health and Safety Training Requirements

Supervisory and field personnel have had prior classroom and hands-on training and/or relevant (documented) health and safety experience which satisfies the training requirements of OSHA's regulation for Hazardous Waste Operations and Emergency Response (29 CFR 1910.120).

For site activities, a minimum of twenty-four (24) hours of training and relevant field experience, covering, but not limited to, the following topics, has been obtained:

- General site safety;
- Toxicology;
- Hazard recognition;
- Site investigation;
- Use and limitations of personal protective equipment;
- Respiratory protection;
- Hazardous waste management;
- Use of monitoring instrumentation; and
- Decontamination.

It is important to remember that the level of training is consistent with the employee's site and job function and responsibilities. Thus, many individuals will have received the full 40-hours of training appropriate to "site workers". Under all site conditions, individuals with only 24 hours of OSHA training shall be under the direct supervision of someone with 40 hours of OSHA training. If site conditions warrant Level C protection (due to levels of airborne contaminants), then 40 hours of OSHA training will be required for all workers in the Exclusion and Decontamination Zones. Personnel with 24-hour training will be limited to tasks which do not require the use of respiratory protection.

Onsite management and supervisors directly responsible for, or who supervise, employees working within the Exclusion and Decontamination Zones, shall have also received at least eight (8) additional hours of specialized training on managing safety at hazardous waste site operations.

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Site personnel who can show, by appropriate documentation from their employer, that their previous work experience and/or training was equivalent to the training requirements for this project, shall be considered as meeting those requirements. Equivalent training includes the training that might have been received from actual onsite training for previous projects. After their initial training, Arthur D. Little personnel are required to have annual health and safety refresher training. The Arthur D. Little HSO reserves the right to determine training eligibility for Arthur D. Little and subcontractor site workers.

Appendix B: Medical Monitoring Requirements

All personnel engaged in onsite activities are participants in a Medical Monitoring Program at Arthur D. Little which meets the requirements set forth in 29 CFR 1910.120 (Hazardous Waste Operations and Emergency Response). Participants in the medical monitoring program are required to have initial and annual physical examinations. The Arthur D. Little Medical Monitoring Program is coordinated through the Mount Auburn Hospital Occupational Health Department in Cambridge Massachusetts. Dr. Robert Ullian is the assigned physician who supports and oversees the medical monitoring program.

The primary goal of a Medical Monitoring Program is to provide evaluation and ongoing surveillance of the health status of employees potentially exposed to toxic substances as a result of their work-related activities. It is recognized that an active health monitoring program for those employees potentially at risk is an important tool in evaluating the effects of chronic low-level exposures or acute exposures related to operations at hazardous waste sites. The effects of low-level exposures may not become apparent until years after the initial exposure.

The Arthur D. Little program is a typical Medical Monitoring Program which meets 29 CFR 1910.120 requirements and includes laboratory testing, personnel medical history evaluation, physical examination, and specific systemic testing. Each participant undergoes an occupational history evaluation and physical examination, including such parameters as:

- Pulmonary Function Tests;
- Complete Blood Count;
- SMA 20 (Multiphasic Blood Chemistries);
- Urinalysis;
- Chest X-Ray (if indicated);
- Electrocardiogram (if indicated);
- Vision Test;
- General Physical Examination; and
- Specialized tests, as required (e.g., lead, arsenic, PCB screening).

Following the establishment of each participant's baseline values for the above parameters, an annual re-evaluation is conducted to monitor potential changes due to work with hazardous materials.

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In addition to this annual re-examination, provisions are made for specific post-exposure examinations in the event of a suspected exposure during a particular field event. The maximum allowable time lapse between the most recent examination and the initiation of field activities at the site for field personnel is one year.

After each examination, a determination is made by the attending physician regarding the ability of the employee to carry out his or her work assignments, including the use of respirators and other personal protective equipment. Any restrictions recommended by the physician are communicated to the employee and the HSO. An examination is also offered when an employee leaves the company or is reassigned to work that does not involve hazardous wastes.

Appendix C: Accident Prevention Plan

The purpose of this general plan is to assert positive actions to be taken in the recognition, evaluation, and control of safety hazards for the purpose of preventing accidents which may cause personal injury or illness, property damage, or interruption of work.

1.0 Responsibilities

Management - Under the Federal Occupational Safety & Health Act - Title 29 CFR - Arthur D. Little management is responsible for planning deliberate accident prevention measures, providing safe equipment and working conditions, training a competent and safety-minded staff, and maintaining prescribed records of accidents, illnesses, and injuries.

Supervisors - Responsible for observation, evaluation and correction of deficiencies of unsafe conditions, or defective equipment when detected or reported by employees or Government representatives.

Staff - Responsible for use of safety equipment, performing all work in a safe manner, working with deliberate thought of the effects of their actions on others, reporting all unsafe conditions, defective equipment, and injuries immediately to the Supervisor.

Subcontractors - Responsible for full provisions of this Plan.

2.0 Training

Each worker on the site will have been trained in conformance with the provisions of Appendix A. Each employee will also be instructed in the company safety policy, and this Accident Prevention Plan. Additional training will consist of briefings on site-specific toxic or hazardous chemicals, safety hazards, and associated safe work procedures and precautions.

3.0 General Safety Precautions

Buddy System -During site-invasive activities, field personnel shall be in visual or audio contact with at least one other field worker. When respiratory protective equipment is employed within an Exclusion Zone, no fewer than two workers shall be in close proximity within the work area.

An approved first aid kit will be maintained at the site. All injuries, no matter how slight, will be reported to the SHSO for treatment. First aid will be provided at the project site only by those who are qualified through training by the American Red Cross. No others will treat any injuries at the project.

No person will be permitted to operate machinery or work in elevated locations while taking antihistamines or other prescription or non-prescription drugs that can adversely affect their mental judgement or physical abilities.

Instruction will be given in identifying, avoiding, and providing first aid for stinging insects, cold or heat exposure, or poison ivy if encountered on the work.

The use of contact lenses is not allowed onsite when required personal protection is Level Modified D, Level C, or Level B. Under these conditions, prescription safety glasses with side shields must be used.

Consumption of alcoholic beverages prior to and during the work shift is strictly prohibited.

4.0 Sanitation

Eating, drinking, smoking, chewing gum or tobacco, or other similar practices are prohibited within the Exclusion Zone during invasive site activities.

Hands and face must be thoroughly washed before breaks and prior to leaving the work area.

Portable toilets or other suitable sanitary facilities shall be provided to site personnel in accordance with 1910.120(n).

5.0 Fire Prevention

Fire extinguishers (CO₂, ABC or other approved types) will be maintained and stationed at the field vehicles.

No brush or debris will be burned at the project site.

Gasoline will be handled only in OSHA approved safety cans. Engines will be shut off while fueling, with no smoking allowed.

Oily rags and waste will be kept in covered metal containers. All trash and waste will be disposed of daily.

6.0 Housekeeping

Tripping hazards will be eliminated by removal of hoses, cables, and ropes from walkways, by proper storage of materials, and by disposal of waste material.

All debris shall be removed daily.

Drill rods, pipe casing, and other such equipment will be secured such that they do not roll or fall.

7.0 Individual Protective Equipment

Only workers who are trained in the proper use of personal protective equipment will be employed at the work site.

All personnel will wear hard hats and eye protection throughout the project.

Ear protection will be worn by drillers, drillers' helpers, and other field personnel exposed to high-level sound intensity.

Heavy reinforced gloves will be worn when handling wire rope, pipe and rods, and hoist.

Steel toe/steel shank work boots shall be worn by all field personnel.

8.0 Tools

All tools shall be in good condition (without mushroomed heads, split handles or other defects); damaged tools will be repaired promptly or removed from service. This includes privately-owned equipment of the workmen.

Tools shall not be left overhead to fall. Throwing of tools is prohibited.

9.0 Powered Equipment

All machines will be examined daily for safety appliances and condition, and all defects repaired promptly. Periodic maintenance schedules will be followed as recommended by the manufacturer.

All machines will be shut down for adjustment or oiling. During repair of all machines, blocks or stops will be set to prevent falling or moving of parts should any hydraulic line or control device fail.

Workers will climb carefully with handholds and grab irons, not jumping on or off any machine, and in no case while the machine is in motion.

All repairs of hydraulic systems will be with new, manufacturers' parts.

Firm and level standing will be prepared for drills and pumps on land.

10.0 Hazardous and Toxic Materials

All work is to be conducted in accordance with the provisions of the site-specific Health and Safety Plan.

All containers of hazardous materials are to be labelled in accordance with the provisions of OSHA's Hazard Communication Standard (1910.1200).

Workers are to be prepared for working safely in the event toxic materials are known to be onsite, or are disclosed during the work.

Workers will be protected from possible contamination by toxic materials by wearing appropriate personal protective equipment.

Water, soap and clean towels are to be used instantly in the event splashing, dripping, or settling of dust allows suspected concentrations of toxic materials in contact with the body. Persons developing skin rash, burning, or discoloration of skin, or other indications of chemical exposure, are to receive immediate medical attention. If possible, a sample of the material encountered should accompany the victim to assist in treatment. Full precautions are to be taken in collecting and transporting any sample.

11.0 Emergencies

In the event of warning for severe storm, personnel will be evacuated and equipment secured as directed by the Site Health and Safety Officer to prevent loss or damage.

In the prospect of thunderstorms, all work will be suspended. For tornado watch, equipment will be removed from exposed positions and personnel will be protected. Crane booms and drill rig masts will be laid down.

In the event of fire, explosion, chemical exposure, personnel accident or similar emergency, the provisions of the plan shall be observed.

12.0 Accident Reporting, Analysis and Prevention

Every accident will be reported immediately to the Arthur D. Little Site Health and Safety Officer, the Fort Devens Safety Coordinator, and subsequently to the Project Manager.

The Project Manager and SHSO will investigate unsafe conditions, defective equipment, failure of maintenance or improper acts, then initiate appropriate corrective actions including comprehensive training to prevent recurrence.

Supervisory personnel at all levels will follow-up by training and observation directed to prevent repetition. Daily Health and Safety/Accident Prevention meetings will review accidents and discuss remedial action by all workers.

Accidents resulting in a fatality, lost-time injury or illness, hospitalization of five or more personnel, or property damage to government or contractor property (which occurred during the performance of the contract) equal to or exceeding \$2,000.00 must be telephonically reported to USAEC, SES Branch, (410) 671-4811, as soon as possible, but not later than two hours after occurrence and reported in writing within five days of occurrence on DA Form 285 (see Attachment F). All other accidents/incidents must be telephonically reported to USAEC, SES Branch, (410) 671-4811, within eight hours of occurrence.

13.0 Site Safety Inspections

Site safety inspections shall be conducted as needed by Arthur D. Little's Health and Safety staff to ensure compliance with the plan in the field. A complete record and account of each inspection shall be maintained. Attachment D *Daily Site Health and Safety Activity Report* will be utilized by the SHSO to conduct daily safety inspections of the various work areas at Fort Devens.

Health and Safety Plan:Fort Devens
Section No.: Appendix D
Revision No.: 1
Date: June 16, 1993

Appendix D: Site-Specific Health and Safety Plans

See Delivery Order Specific Supplement

Health and Safety Plan:Fort Devens
Section No.: Appendix E
Revision No.: 1
Date: June 16, 1993

Appendix E: UXO Subcontractor Safety Plan and Procedures

See Delivery Order Specific Supplement

Health and Safety Plan:Fort Devens
Section No.: Appendix F
Revision No.: 1
Date: June 16, 1993

Appendix F: Fort Devens Safety Regulations

DEPARTMENT OF THE ARMY
HEADQUARTERS FORT DEVENS
Fort Devens, Massachusetts 01433-5000
3 October 1990

Safety
ARMY SAFETY PROGRAM

SUPPLEMENTATION. Further supplementation of this regulation is prohibited without prior approval from Commander, Headquarters Fort Devens, ATTN: AFZD-SM, Fort Devens, MA 01433-0520.

IMPACT ON NEW MANNING SYSTEM. This supplement does not contain any information that affects the New Manning System.

SUGGESTED IMPROVEMENTS. The proponent of this supplement is the Director of Safety. Users are invited to send comments and suggested improvements on DA Form 2028 (Recommended Changes to Publications) to Commander, Headquarters Fort Devens, ATTN: AFZD-SM, Fort Devens, MA 01433-0520.

AR 385-10, 23 May 1988 is further supplemented as follows:

Page 3 and 4, paragraph 1-4, Responsibilities. Add subparagraph q thru t.

q. The Director of Safety Management will:

- (1) Manage and direct the Fort Devens Safety Program.
- (2) Develop, coordinate and disseminate safety policy and guidance to all Fort Devens activities.
- (3) Maintain a written safety program.
- (4) Monitor program effectiveness.
- (5) Direct a formal safety training program for military and civilian personnel, assisted by occupational health, supervisory personnel and others as directed.
- (6) Implement countermeasures to hazards associated with workplace operations.
- (7) Evaluate directorate and unit safety programs annually.
- (8) Conduct work area surveys to determine the presence of unsafe conditions.

r. Unit Commanders and Staff Directors will:

- (1) Ensure that an individual is assigned, down to and including company level to perform the day to day function of a unit safety officer. The Directorate of Engineering and Housing (DEH), Director of Logistics (DOL), and Director of Personnel and Community Activities (DPCA) will ensure that safety representatives are assigned to perform safety officer functions as listed below. Copies of orders tasking personnel with safety responsibilities will be forwarded to the Fort Devens Safety Office.
- (2) Establish quarterly command safety committees, composed of all unit safety officers and chaired by the commander or deputy; DEH, DPCA and DOL Maintenance Division Committees will include representation by first line supervisors and a union representative. A representative of the Fort Devens Safety Staff will on request, attend to provide guidance and technical assistance. The command safety committee will serve as focal point of the unit/directorate accident prevention effort.
- (3) Require effective completion and submission of FtDevFm 649 (Safety Officer Report Form) (use page 1 for military or page 2 for civilians; see figure 1-1 and figure 1-2) by all safety officers at each quarterly safety committee meeting. A copy of these completed forms will be forwarded to the Fort Devens Safety Office.
- (4) Appoint, on a memorandum, unit safety officers for a period lasting not less than one year, where feasible, to allow for program continuity; ensure that appointed unit safety officers/noncommissioned officers (NCOs) are trained in safety duties and responsibilities by enrolling in the Fort Devens Safety Officer class.
- (5) Assure safety officer and supervisory safety duties are made part of the individual's over-all job performance evaluation.

(6) Assure timely submission of DA Form 285 (Accident Report). Review accident reports and assure implementation of effective corrective action to include remedial training where necessary. Inform the Fort Devens Safety Office when an accident has occurred and give assistance in ascertaining relevant accident facts.

(7) Program adequate funding for hazard abatement, safety clothing and equipment, signs, posters, etc.

(8) Give special emphasis to accident prevention for the purpose of creating safety awareness among all supervisory and operating personnel. With the assistance of the Fort Devens Safety Office, formulate and publicize specific command safety policy regarding accident prevention efforts.

(9) Ensure that adequate provisions for safe practices and safe physical standards are formally incorporated into all directives, standing operating procedures (SOPs), training doctrine, and field training exercises (FTX) operation plans. Coordinate with the Fort Devens Safety Office for briefing on Fort Devens Safety Program requirements, upon assumption of command.

(10) Ensure that adequate quantities of all forms referred to in this supplement are on hand. Fort Devens Forms 646, 647, 648 and 649 are available from the Safety Office; all others are available from USAISC Support Services Branch, Publications Section.

(11) Attend or designate a command representative to attend/support the quarterly Safety and Occupational Health Advisory Committee (SOHAC).

s. Unit safety officers and directorate safety representative will:

(1) Become familiar with Army safety regulations (AR 385 series), training SOPs and appropriate FMs/TMs.

(2) Advise and assist the unit commander/staff director in implementing an effective and on-going safety program designed to enhance mission accomplishment while controlling losses in manpower and equipment.

(3) Complete FtDevFm 649 (Safety Officer Report Form) for timely submission to quarterly command safety committee meetings. The form will serve as a log of quarterly unit safety activities; pertinent areas will be addressed by the unit safety officer at the next quarterly safety meeting. At appendix B is a summary of unit safety officer duties as they pertain to the effective completion of FtDevFm 649.

(4) Develop and implement safety directives, policies, plans and procedures as needed. Ensure incorporation of FtDevFm 647 (FTX Safety Checklist), (figure 1-3), in all FTX operation plans; take steps necessary to monitor and assure adherence in planning and execution of the FTX.

(5) Supervise and conduct safety surveys and inspections at least monthly, using checklists at figure 1-5 and figure 1-6. Completed checklists will become a part of unit safety files.

(6) Report to the Fort Devens Safety Office within ten working days of assignment as unit safety officer or directorate safety representative for an orientation briefing.

(7) Provide for timely submission of DA Form 285 (Accident Report). Check completeness and accuracy of reports and evaluate adequacy of corrective action. Notify the Fort Devens Safety Office when an accident has occurred and give assistance in ascertaining relevant accident facts. Be familiar with unit accident experience and keep the unit Commander/Director informed on specific details such as trends, causes and corrective actions.

(8) Conduct periodic unit safety campaigns designed to promote safety awareness in personnel throughout the unit. Coordinate with staff to assure incorporation of safety in FTXs, demonstrations, field training exercises, and to ensure safety of both Army personnel and the general public.

(9) Ensure compliance of supervisors, noncommissioned officers in charge (NCOICs), and other appropriate personnel with requirements of this regulation.

(10) Assure that all newly arrived personnel receive an adequate safety orientation which covers the unit safety policy, safety procedures, and specific operational training, traffic, climactic and recreational hazards likely to be encountered.

(11) Maintain unit safety files as follows:

(a) Safety Officer appointment memorandum.

(b) Unit Safety Standing Operating Procedure.

(c) DA Pam 385-1, Unit Safety Management.

(d) Record of Accident Experience.

(e) Monthly inspection reports.

(f) Command inspection reports.

(g) List of pending safety related work requests.

(h) Quarterly Safety Officer Report (FtDevFm 649).

(i) Commander's Safety Policy letter.

(j) Safety promotional material (i.e., Countermeasure, safety alerts, safety of use messages, etc).

(k) Respiratory Protection Program Standing Operating Procedure.

(12) Maintain the following regulations and supplements:

(a) AR 385-10, Army Safety Program.

(b) AR 385-15, Water Safety.

(c) AR 385-40, Accident Reporting and Records.

(d) AR 385-55, Prevention of Motor Vehicle Accidents.

(e) AR 385-63, Policies and Procedures for Firing Ammunition.

(f) Fort Devens Regulation 385-1, Hazard Communication Program.

(g) Fort Devens Regulation 350-2, Ranges and Training Facilities.

(h) AR 40-5, Preventive Medicine.

(i) Fort Devens Regulation 40-5, Hearing Conservation Program.

(13) Develop and maintain a Unit Accident Prevention Awards Program in accordance with AR 672-74 and AR 672-5-1. A sample format is available at the Fort Devens Safety Office.

t. Supervisors and NCOICs at all levels, in all units and staff directorates will:

(1) Stress safety as part of new employee job orientation and throughout employment.

(2) Enforce rules pertaining to safe work practices.

(3) Furnish employees with the proper protective clothing and equipment, instruct them in its proper use, and enforce the wearing of such equipment.

(4) Investigate and report all accidents for the purpose of eliminating causal factors.

(5) Ensure that meticulous housekeeping practices are developed and employed at all times.

(6) Constantly monitor work area for hazardous conditions and work practices. Where immediate correction is not possible, coordinate with the activity safety representative or the Fort Devens Safety Staff for the best method of abatement. In accordance with occupational and safety health act (OSHA) regulations, encourage employees to report hazardous conditions to the Fort Devens Safety Office whenever local action is deemed inadequate or unresponsive.

(7) Instruct employees periodically, and as required by the Fort Devens Safety Office, on precautions, procedures, and practices to be followed to control exposure to harmful agents and hazardous conditions; e.g., noise, toxic chemical, sanitation, etc. Resources will be provided by the Fort Devens Safety Office to facilitate the educational process.

(8) Promote safety awareness at all times. Hold regularly scheduled meetings with employees to discuss accidents, causes, and means of prevention.

Page 4, paragraph 1-5, Policy. Add subparagraph g.

g. It is the safety policy of this command that no peacetime operational or training activity warrants unnecessary risk to the safety of personnel. Commanders and directors are the Safety officers for their organizations. All high risk operational and tactical activities will be pre-planned, and potential accident situations inventoried. Therefore, per DA Safety Policy, safety will be assured through strict adherence to Army standards. Adequate training and supervision will be provided to assure that operations are executed to Army standards.

Page 6, paragraph 2-3, Prevention Program Procedures. Add subparagraph d.

d. Tactical Safety and Training Requirements.

(1) Commanders at all levels will ensure that training sections maintain regulations, Training Manuals, Field Manuals, and other training resources for their particular mission. These resources contain safety requirements and standards for the safe operation of equipment and other training operations.

(2) Commanders will request a safety review of operation plans (OPLANS), operation orders (OPORDs), SOPs and other training directives by the Safety Office for field operations and high risk training activities.

(3) Risk management is an effective tool for managing training in the planning and execution stages of an FTX. Leaders at all levels will incorporate risk management techniques relevant to the units' mission and training requirements. At appendix B is a chart describing the risk management process.

(4) The Safety Office will provide a troop safety coordinator to assist units in the field in assuring the incorporation of safety requirements in high risk areas such as the storage and handling of pyrotechnics, ammunition and explosives, petroleum, oils, and lubricants (POL), convoy procedures, heating appliances, etc. Units requesting assistance visits will receive higher priority.

(5) The below listed safety training topics are mandatory for all unit personnel:

- (a) Hot/Cold Weather Injury Prevention
- (b) Winter Driving
- (c) Convoy/Tactical Operations
- (d) Storage/Handling of Ammo/Explosives/Pyrotechnics
- (e) Water Safety
- (f) Maintenance/Shop Safety

(g) Equipment Training (per AR 600-55, Motor Vehicle Driver and Equipment Operator Selection, Training, Testing and Licensing).

(h) Army Driver Improvement Course

(6) The below listed Safety Training Topics are required for individuals as relevant:

- (a) Motorcycle Training
- (b) Driver Improvement Training
- (c) Unit Safety Officer Training
- (d) Hazard Communication Training

(7) Complete lesson plans and audio-visual aids are available at the Fort Devens Safety Office on all topics listed above. Commanders will assure that training is given by "key personnel" in the chain of command with "maximum decentralization encouraged", as per AR 350-1, Army Training. To this end commanders will ensure that these key personnel (e.g., NCOICs, supervisors, squad leaders, etc) are adequately prepared to carry out their safety training responsibilities.

(8) Range Safety Officers and NCOs will be certified by Range Control as fully competent in the technical and safety aspects of any/all weapons they oversee per AR 385-63.

Page 6, paragraph 2-3, Prevention Program Procedures. Add subparagraph e.

e. Accident Investigation.

(1) Every accident, regardless of severity, requires some form of supervisory investigation. In accordance with AR 385-40, Accident Reporting, an accident involving military personnel or military vehicles must be reported on DA Form 285 and forwarded to the Safety Office not later than 7 days after the occurrence. An accident which produces an injury to a civilian employee must be reported on a CA-1 or CA-2 form and forwarded to the Directorate of Civilian Personnel (DCP) not later than 2 days after the occurrence.

(2) On a monthly basis, major tenant activities Medical Department Activity (MEDDAC), U.S. Army Intelligence School Devens (USAISD), and 10th Special Forces Group (Airborne), will report to the Safety Office with an overview of the past months accident experience. The report will include number of civilian personnel injuries (CPI) number of military personnel injuries (MPI) and number of Army Motor Vehicle (AMV) accidents.

(3) A Federal Employee Compensation Act (FECA) working group consisting of Safety Occupational Health, Director Civilian Personnel (DCP), DEH, and DOL personnel will meet every two months to review civilian accident experience and discuss trends and corrective actions.

(4) The supervisor has a very active and critical role in the successful administration of the FECA program. The role of the supervisor includes--

(a) Getting the injured employee to Cutler Army Community Hospital for initial first aid and evaluation.

(b) Assuring that injuries are reported in a timely manner to Director of Civilian Personnel (DCP) and the Safety Office.

(c) Assuring that the proper forms are completed by both the employee and the supervisor.

(d) Providing liaison between the employee and the DCP in matters of work-related injury and illness.

(e) Making inquiries to ascertain the appropriate corrective action and to make sure that the injury is job related.

(f) Assisting in evaluating the employee's fitness to perform his/her assigned duties.

(g) Maintaining liaison with the injured employee during the recuperation period to show concern and to assist the employee in returning to work as soon as possible and reasonable as determined by the case physician.

(h) Assisting in evaluating the employee for light-duty assignments.

(i) Modifying job requirements to accommodate "light-duty" employees.

(j) Assisting employees in scheduling appointments to visit the Civilian Personnel Office.

Page 15, paragraph 6-1, Protective Clothing and Equipment Program. Add subparagraph i thru m.

i. Supervisors will ensure that:

(1) Employees are provided adequate protective clothing and equipment (PC&E) and that they maintain and wear PC&E. Film dosimeter badges will be worn in radiation areas.

(2) Employees are scheduled and show up for periodic health examinations as required in AR 40-5. Examinations will be coordinated through the Preventive Medicine Activity.

(3) Employees do not enter into any confined space (i.e., tank, manhole, boiler or area where the ability of the individual to quickly depart is hampered) without obtaining a pre-entry clearance from Safety or Preventive Medicine, or have on hand test instruments to test for lack of oxygen and/or toxic or flammable gases.

(4) Employees do not wear loose, hanging or frayed clothing, such as dangling ties, rings, loose watch chains or neck chains around moving machinery or other sources of possible entanglement.

(5) Employees performing grounds maintenance activities wear, in addition to hearing and eye protection where necessary, long pants and sturdy shoes with adequate soles to prevent slipping and abrasions to legs from weed cutters, poison ivy, etc.

j. All personnel, both military and civilian employees, are subject to disciplinary action for failure to wear required protective clothing and equipment. The first step in constructive discipline is the supervisor explaining to the employee the requirement to wear PC&E for the particular job, to include notice that discipline can result for non-compliance. When informal procedures fail, the supervisor will document each subsequent violation by preparing a Notice of Safety Violation for Failure to Wear Protective Clothing and Equipment (figure 1-4), and promptly seek advice and assistance in administering discipline. This memorandum can be used as a basis for disciplinary action and should be maintained by the organization's Safety Officer. Commanders and supervisors will require all personnel, including visitors, to wear adequate protective clothing and equipment while working in designated hazardous areas (see appendix E).

k. Military and civilian personnel are subject to disciplinary action as follows:

(1) Military: Violation of Article 92, Uniform Code of Military Justice, for failure to obey a lawful regulation or verbal or written order or for dereliction of duty.

(2) Civilian: Failure to observe any written regulation, order, rule, or procedure prescribed by competent authority, where safety to persons and/or property is endangered. Discipline is administered in accordance with AR 690-700, Chapter 751 (and applicable collective bargaining agreement, if any), and only in coordination with the Directorate of Civilian Personnel. Based upon an assessment of the pertinent circumstances of each individual case, the penalty can range from oral admonishment or written warning (informal discipline) through reprimand and suspension to removal (formal discipline).

l. To remind employees of this requirement, the Safety Policy for Employees (appendix F) will be posted at locations where employees normally report to work.

Add Figure 1-1 thru Figure 1-7.

Add Appendix B thru Appendix F.

**MILITARY SAFETY OFFICER REPORT
FOR COMMAND SAFETY COMMITTEE
(FD Suppl 1 to AR 385-10)**

RCS: AF2D-SM-089-01

Safety Off Completing Report Rank Unit Date

I. ACCIDENT EXPERIENCE:

- a. Number of accidents experienced: _____
- b. Number of accidents investigated: _____
- c. Problem areas: _____

II. INSPECTIONS:

- a. Date of quarterly inspection (see encl checklist) _____
- b. Spot checks: (check as applicable)
 - (1) Job site conditions/work practices _____
 - (2) Protective clothing and equipment _____
 - (3) Barracks _____
 - (4) Safety incorporated in all FTX's _____
- c. Problem areas: _____

III. TRAINING:*

- a. Date/subject of quarterly safety class _____
- b. Spot checks of training activities:
 - (1) Training SOPs _____
 - (2) FTXs _____
 - (3) Maneuvers _____
 - (4) Firing range/CBR _____
 - (5) Field or motor march _____
- c. Problem areas: _____

IV. PROMOTIONS:

- a. Bulletin boards up to date _____
- b. Commander's Call (safety topic) _____
- c. Methods used to increase troop safety awareness:
 - (1) Awards (Company of the Month, etc) _____
 - (2) Posters/displays/contests _____
 - (3) Handouts/publications _____
 - (4) Corrective training (DDC, RDT, etc) _____

*There exists a fine line between training realism and foolish risk-taking. The Unit Safety Officer's job is to monitor that "line" by coordinating with the Unit Training Officer to assure that safety is fully incorporated in all aspects of training maneuvers and FTXs.

FtDevFm 649 (OT) Cont.
Nov 89

CIVILIAN SAFETY OFFICER REPORT
FOR COMMAND SAFETY COMMITTEE
(FD Suppl 1 to AR 385-10)

RCS: AFZD-SM-089-01

(Objective: To uncover and correct accident-producing conditions)

NAME	ORGANIZATION	DATE
------	--------------	------

I. ACCIDENT EXPERIENCE:

- a. Number of accidents experienced _____
- b. Number of accidents investigated _____
- c. Problem areas: _____

II. INSPECTIONS:

- a. Date of quarterly inspection _____
- b. Spot Checks:
 - (1) Job site conditions _____
 - (2) Work practices _____
 - (3) Health exposures (noted and monitored) _____
 - (4) Protective clothing and equipment _____
(Provided - Used - Maintained)
- c. Problem areas: _____

III. TRAINING:

- a. Date/subject of quarterly OSHA class _____
- b. Supervisory safety talk _____
- c. Suggested topics/problem areas _____

IV. PROMOTION:

- a. Bulletin boards up to date _____
- b. Supervisory safety meeting _____
- c. Awards/displays/contests _____

FtDevFm 649 (OT)
Nov 89

FTX SAFETY CHECKLIST
(FD Suppl 1 to AR 385-10)

Elaborate on reverse side.

YES	NO	A. Convoy and traffic control procedures adhered to:
<input type="checkbox"/>	<input type="checkbox"/>	a. Route adequately planned.
<input type="checkbox"/>	<input type="checkbox"/>	b. Drivers have had 8 hours rest during 12 hours prior to convoy departure time.
<input type="checkbox"/>	<input type="checkbox"/>	c. Drivers have received an orientation/safety briefing prior to convoy departure.
<input type="checkbox"/>	<input type="checkbox"/>	d. Operators drive a maximum of 10 hours in any 24 hour period. (AR 385-55)
<input type="checkbox"/>	<input type="checkbox"/>	e. Pre-fixed locations and time of rest halts.
<input type="checkbox"/>	<input type="checkbox"/>	f. Adequate distance between vehicles.
<input type="checkbox"/>	<input type="checkbox"/>	g. Vehicles marked and lighted as required.
YES	NO	B. Areas spaced and specifically designated for each field operation:
<input type="checkbox"/>	<input type="checkbox"/>	a. Vehicle parking
<input type="checkbox"/>	<input type="checkbox"/>	b. POL storage.
<input type="checkbox"/>	<input type="checkbox"/>	c. Explosives storage.
<input type="checkbox"/>	<input type="checkbox"/>	d. Sleeping area.
<input type="checkbox"/>	<input type="checkbox"/>	e. Latrine.
<input type="checkbox"/>	<input type="checkbox"/>	f. Waste disposal.
<input type="checkbox"/>	<input type="checkbox"/>	g. Mess/cooking area
YES	NO	C. Fire marshalls and fire guards appointed and doing their job.
<input type="checkbox"/>	<input type="checkbox"/>	a. Tents, ammunition storage, kitchens, POL areas inspected daily.
<input type="checkbox"/>	<input type="checkbox"/>	b. "No Smoking" areas posted and enforced.
<input type="checkbox"/>	<input type="checkbox"/>	c. Prohibit gasoline to start fires/clean parts.
<input type="checkbox"/>	<input type="checkbox"/>	d. Mark/storage/control of all flammable liquids.
<input type="checkbox"/>	<input type="checkbox"/>	e. Fire extinguishers readily available as appropriate.
<input type="checkbox"/>	<input type="checkbox"/>	f. Tent stoves monitored and checked.
YES	NO	D. SOP's established and enforced, as appropriate, in following areas:
<input type="checkbox"/>	<input type="checkbox"/>	a. Hot Wx/Cold Wx injury prevention.
<input type="checkbox"/>	<input type="checkbox"/>	b. Lightning storms.
<input type="checkbox"/>	<input type="checkbox"/>	c. Water safety.
<input type="checkbox"/>	<input type="checkbox"/>	d. Hazardous fauna, insects, animals, etc.
<input type="checkbox"/>	<input type="checkbox"/>	e. High-risk training (e.g., rappelling, river crossing, etc).
YES	NO	E. Explosives properly transported, handled and stored:
<input type="checkbox"/>	<input type="checkbox"/>	a. Live and blank ammunition are not intermingled.
<input type="checkbox"/>	<input type="checkbox"/>	b. Pyrotechnics handled by authorized personnel only.
<input type="checkbox"/>	<input type="checkbox"/>	c. Dud safety procedures publicized and enforced.

FtDevFm 647 (OT), Nov 89

Figure 1-3 Sample FTX Safety Checklist

Office Symbol (385)

(Date)

MEMORANDUM FOR Director of Civilian Personnel, ATTN: AFZD-CP-PSD, Box 24
SUBJECT: Notice of Safety Violation

The Notice of Safety Violation should contain the following information:

1. Employee's Name
2. Employee's Grade/Rank
3. Employee's SSN
4. Employee's Age
5. Employee's Occupation
6. Employing Organization
7. Hour, Date and Exact Location of Violation
8. Description of Violations
9. Prior Safety Violations
10. Supervisor's Corrective Action

(Signature Block)

CF: Safety Management Office

BARRACKS SAFETY INSPECTION CHECKLIST
(FD Suppl 1 to AR 385-10)

This list is not all inclusive. Elaborate on reverse side. Call Fort Devens Safety Office for assistance - 3971.

INSPECTOR: _____ UNIT: _____ DATE: _____

	<u>SAFE</u>	<u>UNSAFE</u>
1. <u>FIRE PROTECTION:</u>		
a. Fire plan posted	_____	_____
b. Exits clear & unlocked	_____	_____
c. Panic hardware operable	_____	_____
d. Fire drill conducted w/alarms & smoke detectors tested	_____	_____
e. Extinguishers adequate	_____	_____
f. Flammables centralized & stored outside	_____	_____
g. Appliances in rooms tagged by fire department	_____	_____
h. No gasoline stored in facility	_____	_____
i. Trash emptied regularly	_____	_____
j. Rules for firewatch enforced	_____	_____
2. <u>ELECTRICAL:</u>		
a. Electrical exposures	_____	_____
b. Extension cords	_____	_____
c. Circuits grounded	_____	_____
d. Circuits not overloaded	_____	_____
3. <u>LATRINE:</u>		
a. Shower safety lights	_____	_____
b. Housekeeping	_____	_____
c. Trash & butt cans w/covers	_____	_____
d. Soap dishes provided	_____	_____
4. <u>PASSAGEWAYS:</u>		
a. Housekeeping	_____	_____
b. Well lighted	_____	_____
c. No broken windows	_____	_____
d. Clear & uncongested stairways	_____	_____
e. Secure railings	_____	_____
f. Decorations non-flammable	_____	_____
g. No tripping/slipping hazards	_____	_____
5. <u>SAFETY BULLETIN BOARD:</u>		
a. Neat & attractive	_____	_____
b. Display changed quarterly	_____	_____
c. OSHA & Dial SAFE Posters up	_____	_____
5. <u>MISCELLANEOUS:</u>		
a. Walk & entryways free of ice	_____	_____
b. Emergency lights operative	_____	_____
c. General housekeeping	_____	_____
d. No combustibles stored in basement	_____	_____
e. Recreation/laundry/orderly rooms in good shape	_____	_____

FtDevFm 646 (OT)
Nov 89

Figure 1-5 Sample Barracks Safety Inspection Checklist

Occupational Safety Inspection Checklist
(FD Suppl 1 to AR 385-10)

This list is not all inclusive. Elaborate on reverse side. Call Post Safety Office for assistance - 3971.

INSPECTOR: _____	UNIT _____	DATE _____
1. FIRE PROTECTION:	SAFE	UNSAFE
a. Fire evacuation plan current	----	----
b. Fire extinguishers adequate	----	----
c. Flammable liquid storage centralized/outdoors	----	----
d. No gasoline stored in bldg.	----	----
e. Exits open, marked, adequate	----	----
f. "No Smoking" posted & enforced	----	----
g. Trash bins emptied; oily rags stored in covered containers	----	----
h. Dip tank for cleaning parts	----	----
(1) Gloves		
(2) Warning Sign		
(3) Solvent used		
2. HOUSEKEEPING:		
a. Aisles, stairs & floors	----	----
b. Storage & stacking of materials	----	----
c. Wash-up area	----	----
d. Lights & ventilation	----	----
e. Oil spills cleaned up	----	----
f. Waste oil disposal	----	----
g. POL and yard area	----	----
3. PERSONAL PROTECTIVE EQUIPMENT:		
a. Provided; used; maintained	----	----
b. Mechanic's indiv issue includes goggles, safety shoes, hearing muffs.	----	----
c. Noise & eye hazard signs posted where applicable.	----	----
d. Hearing tested annually	----	----
e. Tire cage used	----	----
f. See "Welding", "Battery" & "Painting" sections	----	----
g. Gloves & hook for generator ops.	----	----
4. ELECTRICAL:		
a. Grounding/bonding	----	----
b. Worn extension cords/3-prong plug	----	----
c. Hazardous locations	----	----
d. Elect. exposures	----	----
5. MATERIAL HANDLING EQUIPMENT:		
a. Adequate # jacks, jack-stands, cribbing blocks.	----	----
b. Safe load limits posted on all jacks, cranes, overhead hoists, wreckers, etc.	----	----
c. Cables, chains, ropes, hooks inspected for defects	----	----
d. Correct lifting techniques stressed	----	----
6. MACHINERY:	SAFE	UNSAFE
a. Point of operation, guarded	----	----
b. Belts, pulleys & gears guarded	----	----
c. Air compressor drained of oil & water	----	----
d. Hand tools adequate	----	----
e. Power tool cords & 3-prong ground plug	----	----
7. FIRST AID:		
a. Eye wash fountains & delugs showers adequate	----	----
b. All injuries reported	----	----
8. UNSAFE PRACTICES:		
a. Excessive speed of vehicle	----	----
b. Backing w/o ground guide	----	----
c. Improper lifting	----	----
d. Smoking violations	----	----
e. Horseplay	----	----
f. Removing machine guards	----	----
g. Work on unguarded moving machinery	----	----
h. Work w/o personal protective equipment	----	----
9. BULLETIN BOARD:		
a. Neat & Attractive	----	----
b. Display changed qtrly	----	----
c. OSHA & Dial-SAFE Posters up	----	----
d. Located in designated break area	----	----
10. SPECIAL OPERATIONS:		
a. Btry Charging: Except for occasional trickle charge w/ field charger, btry charging on Post is prohibited. Batteries may be turned into TDA on a one for one basis	----	----
b. Welding:		
(1) Operator trained in correct procedures	----	----
(2) Aprons, jacket, gloves	----	----
(3) Adequate eye procedures	----	----
(4) Welding screens, blankets & fire extinguishers	----	----
(5) Welding prohibited near flammables	----	----
(6) Ventilation adequate; respirator available	----	----

FtDevFm 64B (OT)
Nov 89

Figure 1-6 Sample Occupational Safety Inspection Checklist

SAFETY INSPECTION CHECKLIST (FD Suppl 1 to AR 385-10)			
TO:	FROM:		
On _____ a general safety inspection was conducted in area(s) () A () B () C () D () E by _____.			
A. OFFICE	YES	NO	NA
1. Machines and equipment properly guarded?			
2. File cabinets stable; drawers closed?			
3. Clean, even working surface?			
4. Desks and chairs in need of replacement?			
5. Aisles wide enough?			
6. Electrical cords in need of replacement? (frayed, broken insulation)			
7. Is temporary wiring, where needed, left lying on floor?			
8. Are fans properly guarded?			
9. Fire extinguishers properly mounted and periodically checked?			
10. Lighting adequate?			
B. WAREHOUSE	YES	NO	NA
1. Aisles marked and kept free of materials?			
2. Stored material in stable stacks?			
3. No smoking rules enforced?			
4. Trash cans available and frequently emptied?			
5. Material stored so as not to interfere with exists and fire extinguishers?			
6. Proper clearance (18") between stacked materials and light fixtures?			
7. Fire extinguishers properly mounted and charged?			
C. MACHINE SHOPS	YES	NO	NA
1. Do guards give maximum protection to operator?			
2. Are all guards in place and properly adjusted?			
3. Is there evidence that operators remove the guard or barriers?			
4. Are hand tools properly maintained?			
5. Do power hand tools have switches guarded to prevent accidental starting?			
6. Are grinders and saws properly guarded?			
7. Are signs posted designating "Noise Hazardous Areas"?			
8. Are signs posted designating "Eye Protection Required"?			
9. Are employees issued the proper protection devices? (Safety shoes, hearing and eye protection)			
10. Are rules governing the use of protective equipment enforced?			
11. Are fire extinguishers properly mounted and charged?			
12. Is an excess amount of chips, metal or wood allowed to accumulate around machines?			

PtDevFm 645 (OT) Replaces PtDevFm 462 which may
 Nov 89 be used until supply exhausted

Figure 1-7 Sample Safety Inspection Checklist

D. MOTOR POOLS		YES	NO	NA
1.	Is the ventilation system adequate?			
2.	Are employees provided with the proper protective equipment? Is their use enforced?			
3.	Are flammable materials stored in approved storage cabinets?			
4.	Are floors kept clean and free of oil, grease, gasoline and other hazardous or slippery substances?			
5.	Are spills immediately sanded and cleaned?			
6.	Are pits cleaned regularly?			
7.	Are guard devices used during inflation of tires?			
8.	Are jacks labeled with their load limit?			
9.	Are gas tanks removed from vehicles, drained, steamed and filled with water before welding operations?			
10.	Are shop entrances and exits clearly marked?			
11.	Are the load limits for cranes and derricks clearly indicated?			
12.	Are cables or wire ropes inspected for broken strands, corrosion and other defects?			
13.	Are only approved types of solutions used for cleaning parts and equipment?			
14.	Is a deluge shower provided in the battery shop?			
E. BARRACKS		YES	NO	NA
1.	Do all fire doors swing out?			
2.	Are exits clearly identified?			
3.	Are fire extinguishers properly mounted and charged?			
4.	Are stairways well lit? Have secure railings?			
5.	Do lights in shower stalls have shatterproof shields and explosion shields?			
6.	Are electrical outlets covered?			
7.	Are washers and dryers properly grounded?			
8.	Are soap dishes provided in showers?			
9.	Are containers provided for used razor blades?			
10.	Are trash cans provided? Have they covers?			
F. REMARKS:				
TYPED NAME, GRADE, TITLE		SIGNATURE		DATE

Figure 1-7 Sample Safety Inspection Checklist (continued)

Appendix B

The chart below depicts a basic operational process. The left column outlines major mission phases, and the middle column depicts typical operational activities associated with each mission phase. The right column lists a variety of safety-related activities that can be used in various combinations to improve safety. Although these activities are shown separately, it must be emphasized that they take place as part of the operational activities shown in the middle column.

<u>MISSION PHASE</u>	<u>OPERATIONAL ACTIVITY</u>	<u>SAFETY ACTIVITY</u>
Commander's Mission	<ul style="list-style-type: none"> . Initial estimate . Evaluate mission options . Develop operational alternatives . Decision Making 	<ul style="list-style-type: none"> . Mission analysis . Hazard assessment . Risk assessment . Risk reduction . Risk reduction options
Preparation of Operation Plans and Orders	<ul style="list-style-type: none"> . Mission briefing . Company level plans/orders 	<ul style="list-style-type: none"> . Safety review and input to briefings, orders, and SOPs . Special safety briefings and training
Preparation for Operations	<ul style="list-style-type: none"> . Prepare equipment . Prepare troops . Make necessary changes 	<ul style="list-style-type: none"> . Safety checks . Special training . Higher-level support
Conduct operations	<ul style="list-style-type: none"> . Lead tactical and logistical operations . Change plans as required 	<ul style="list-style-type: none"> . Enforce compliance with safety guidance . Review changes for risk implications
After Action	<ul style="list-style-type: none"> . Assess performance strengths and weaknesses 	<ul style="list-style-type: none"> . Assess risk management effectiveness

Appendix C

C-1. Occupational Vision Program. Refer to AR 40-5.

C-2. Hearing Conservation Program. Refer to FD Suppl 1 to AR 40-5.

C-3. Respiratory Protection Program

a. General. When atmospheric contamination cannot be immediately abated by engineering controls, respirators shall be used. An effective Respiratory Protection Program requires close liaison between workers, supervisors, safety personnel and preventive medicine personnel.

b. Responsibilities.

(1) The Safety Office will establish and evaluate the installation Respiratory Protection Program with technical assistance from Preventive Medicine, MEDDAC and coordinate with Preventive Medicine to:

(a) Review and act as the approving agency for all unit level respirator usage SOPs.

(b) Conduct regular inspections and evaluations of the Respirator Protection Program in accordance with Technical Bulletin (TB) Med 502, paragraph 2-1f. Ensure that respirators are properly selected, fit tested, used, cleaned, stored and maintained with an adequate inventory of spare parts.

(c) Provide hands on training for all respirator users who have been medically cleared by Preventive Medicine.

(d) Qualitative Fit Test personnel requiring the use of a respirator before it is issued. Employees unable to achieve a satisfactory fit will not be certified.

(e) Quantitative Fit Test personnel requiring the use of a respirator when the use of quantitative fit test apparatus is a Department of the Army requirement.

(2) MEDDAC, Preventive Medicine will:

(a) Assist the Safety Office to establish, manage and evaluate the installation Respiratory Protection Program.

(b) Perform worksite inspections to determine the proper respirator for the task or area involved and make written recommendations to the Safety Office.

(c) Perform appropriate medical examinations of respirator users prior to issue of a respirator and annually thereafter. Included in this examination will be spirometry and a chest film if required. Results of medical monitoring examinations will be forwarded to the Safety Office prior to respirator fit testing.

(d) Assist the Safety Office in providing training to respirator users.

(e) Perform qualitative fit testing of employees requiring the use of a respirator.

(f) Coordinate with the Safety Office to review all unit level respirator usage SOPs and make appropriate recommendations to meet program requirements and conduct regular inspections and evaluations of the Respiratory Protection Program, IAW TB Med 502, paragraph 2-1f. Ensure that respirators are properly selected, used, cleaned, stored and maintained.

(3) Supervisors will:

(a) Prepare an SOP on respirator use for their particular work area and/or operations using the sample provided herein as a guide.

(b) Ensure that the SOP is reviewed and approved by the Safety Office and Preventive Medicine prior to publication.

(c) Ensure that workers are familiar with the SOP and that all employees are medically examined prior to the issuance of a respirator.

(d) Enforce the wearing of respirators where required.

(e) Ensure that workers shall not be allowed to perform tasks requiring respiratory protection when an effective face piece to face fit cannot be obtained.

- (f) Establish a cleaning and maintenance program for respirators.
- (g) Procure only NIOSH/MSHA approved Respiratory Protection devices.
- (h) Inform the Safety Office and Preventive Medicine of any operational changes.
- (4) Respirator users will:
 - (a) Wear a respirator where required.
 - (b) Use respirators according to instructions and training provided.
 - (c) Be familiar with the specific SOP relating to respirator usage within their particular work area or operation.
 - (d) Perform routine maintenance and properly store their assigned respirator.
 - (e) Notify their supervisor immediately of a defective respirator or any incident which comprises their health or safety.

c. Standing Operating Procedures:

- (1) Written SOPs shall:
 - (a) Be prepared by supervisory personnel for each worksite requiring the use of respirators (see appendix D).
 - (b) Be approved by the Safety Office and Preventive Medicine prior to publication.
 - (c) Include all necessary information for proper respirator selection, use, storage, maintenance and medical surveillance.
- (2) Workers will be familiar with the written SOP as it applies to the respirators available.

d. Selection and Use of Respirators:

- (1) All respirators procured for use will be approved by the Safety Office and Preventive Medicine.
- (2) Selection criteria at a minimum will be based upon the guidance of TB Med 502 ANSI Z88.2-1980.
- (3) A sufficient variety of sizes and types must be made available to ensure that employees obtain a proper face piece to face fit.

e. Training:

- (1) Respirator training will be conducted jointly by the Safety Office and Preventive Medicine and will include as a minimum:
 - (a) Discussion of the nature of the hazard requiring respiratory protection.
 - (b) Respirator selection and limitations.
 - (c) Fit Testing (Qualitative).
 - (d) Handling, use, cleaning, and maintenance of the respirator.
- (2) Training will be conducted for both respirator users and their supervisors upon assignment and bi-annually thereafter.
- (3) Special training requests will be handled on an individual basis in line with the availability of staff resources.

Appendix D

STANDING OPERATING
OPERATING PROCEDURE
NO _____

Headquarters Fort Devens
(Preparing office/agency)
(Location)

Safety
RESPIRTORY PROTECTION

(Effective Date)

1. Purpose. This Standing Operating Procedure (SOP) prescribes procedures for selecting, using and maintaining respiratory protective equipment in a manner that will ensure adequate and proper protection for employees working in environments containing harmful concentrations of dusts, fumes, mists, gases or vapors.

2. References.

- a. OSHA Standard 29 CFR 1910.134, Respiratory Protection
- b. ANSI Z 88.2-1980
- c. TB Med 502, Respiratory Protection Program

3. Applicability. Applies to all activities whose operations require the use of respiratory protection.

4. Procedures.

a. Respirator protection equipment will be furnished at no cost to the employee and will be used as a condition of employment where applicable.

b. Respirators will be selected and used based upon the extent and nature of the hazards to which the worker is exposed. Respiratory Protection equipment will only be used for the intended purpose and modifications to the equipment shall not be made.

c. Supervisors shall enforce the requirements of this SOP and initiate disciplinary action against offenders according to the provisions of AR 690-700, chapter 751 (and applicable collective bargaining agreements).

5. Respirator Inspection Checklist

<u>COMPONENT</u>	<u>EXAMINE FOR</u>	<u>REMEDY</u>
Face piece	Cracks, tears, holes Melting or stiffening Distortion	Replace Place face piece on shelf free from any restraints. If distortion is removed, the face piece may be placed in service. If not, replace it.
Headboard	Breaks, frays or tears Loss of elasticity Missing or bent hardware	Replace Replace Obtain new hardware from distributor or manufacturer.
Inhalation Valve	Dust or dirt on valve Dust or dirt on valve seat Missing valve flap Cracks or tears in valve material Distortion or stiffening of valve material	Clean Clean Replace Replace Replace
Exhalation System	Dust or dirt on valve Dust or dirt on valve seat Missing valve flap Missing valve cover Cracks or tears in valve material	Clean Clean Replace Replace Replace

<u>COMPONENT</u>	<u>EXAMINE FOR</u>	<u>REMEDY</u>
	Distortion or stiffening of valve material	Replace
	Distorted, scratched or cracked valve seat	Replace
Filter or Cartridge	Appropriate for containment	Replacement with correct element
Cartridge	Worn threads	Replace
	Cracks in housing	Replace
	Accumulation of paint	Replace
Filter	Accumulation of paint	Replace

(Signature block)

Appendix E
List of Hazardous work Areas

Directorate of Engineering and Housing

	<u>NOISE</u>	<u>EYE</u>	<u>SHOE</u>	<u>RESPIRATOR</u>
Carpenter, PM Building T-1416	X	X	X	X
Plumbing Shop, T-1415		X	X	X
Boiler Shop, T-1413		X	X	X
Heating Shop, T-1418		X	X	X
Electric Shop, T-1420		X	X	
Refrigeration Shop, T-1419		X	X	
Paint Shop, T-1421		X	X	X
Sheet Metal Shop, T-1421	X	X	X	X
Roads and Railroads, Building 219	X	X	X	
Land Management, T-245	X	X	X	X
Water and Sewage		X	X	X
Masonry Shop, T-1416	X	X	X	
Entomology	X	X	X	X
Warehouse #16	X	X	X	X
Family Housing Warehouse 1431			X	
Solid Waste			X	

Director of Personnel and Community Activities

Crafts Shop, Building 3586	X	X	X	
Bowling Alley, Building 2007	X		X	
Auto Crafts Shop, Building 3587		X	X	
Golf Course Grounds Maintenance	X	X	X	X
Redemption Center			X	

Directorate of Information Management

Duplicating Section, Building 3577	X	X		
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Directorate of Logistics

Installation Materiel Maintenance Division

Battery Shop		X	X	X
Machine Shop	X	X	X	X
Canvas Repair		X	X	
Furniture Repair		X	X	
Carpenter Shop	X	X	X	

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	<u>NOISE</u>	<u>EYE</u>	<u>SHOE</u>	<u>RESPIRATOR</u>
Artillery Repair		X	X	
Body Shop	X	X	X	X
Paint Shop	X	X	X	X
Wheeled Vehicle Repair	X	X	X	
Heavy Equipment Repair	X	X	X	
Electric & Mechanical Equipment Repair	X	X	X	
Aircraft Section, Building 3818	X	X	X	
Installation Supply & Services Division				
Supply, Building 1400			X	
<u>Directorate of Plans, Training, Mobilization, and Security</u>				
Range Control	X	X	X	
NBC School				X
Training Aids				
Model Shop, Building 216	X	X	X	X
Audio Visual, Building 1434	X	X	X	
<u>36th Medical Battalion</u>				
Motor Pools, Buildings 616 and 617	X	X	X	
<u>39th Engineer Battalion</u>				
Motor Pools, Buildings 601 and 602	X	X	X	
Motor Pools, Buildings 603 and 604	X	X	X	
Combat Construction, Building 2687	X	X	X	X
<u>46th Combat Support Hospital</u>				
Building 3574	X	X	X	X
<u>Combat Support Battalion</u>				
Motor Pool, Building 1401	X	X	X	
<u>Aviation Division</u>				
Hangar, Building 3813	X	X	X	
Hangar, Building 3818	X	X	X	
POL Area	X	X	X	
Operations, Building 3822	X			

NOTE: Employees involved in handling Polychlorinated Biphenyl (PCB) are required to wear appropriate protective clothing and equipment.

NOTE: Employees performing work that involves contact with asbestos are required to wear appropriate protective clothing and equipment.

	<u>NOISE</u>	<u>EYE</u>	<u>SHOE</u>	<u>RESPIRATOR</u>
<u>10th Special Forces Group</u>				
Motor Pool, Building 612	X	X	X	
Motor Pool, Building 613	X	X	X	
Motor Pool, Building 2579	X	X	X	
<u>Commissary</u>				
				<u>HEADGEAR</u>
Meat Cutting Area	X*	X	X(Non-Skid)	X
Warehouse Section	X**		X	X
Grocery Department (Shelf Stockers)	X**		X	
Dairy and Frozen Foods	X**		X	
Produce Department	X**		X	
Maintenance			X	
Supply			X	X

NOTE: Meat Cutters are required to wear safety gloves and aprons.

NOTE: Hard hats will be worn by all personnel operating materials handling equipment (MHE).

*While operating band saw

**While operating cardboard bailer.

Defense Reutilization and Marketing Office

Warehouse	X	X	X
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NOTE: Hard Hats will be worn by all personnel operating MHE.

MEDDAC

Cast Room	X	
Medical Maintenance	X	
Brace Shop		X
Dental Lab		X
R & V Shops		X
Food Service Area		X
Veterinary Clinic		X

US Army Information Systems Command

Radio Operations, Building 1456	X	X
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US Army Intelligence School Devens

Shop 1, Building 12	X		X
Shop 2, Building 11	X		X
Shop 3, Building 3412 Area	X		X
Shop 4, Building 12	X	X	X
Shop 5, T-1473	X	X	X
Shop 6, Building 1696	X		X
Maintenance Branch, T-1637	X		X

Appendix F

SAFETY POLICY FOR EMPLOYEES

F-1. All military and civilian employees:

- a. MUST wear hard hats on all jobs where there is danger of being struck by falling or moving objects, and on all roadwork.
- b. MUST wear safety glasses when chipping, grinding, operating a jackhammer, drilling above chest height, or whenever an eye injury hazard exists.
- c. MUST wear safety shoes when working in areas as listed in appendix E.
- d. MUST wear hearing protection when performing work in a noise hazardous area.
- e. MUST wear respiratory protection when working in an area or with a process that is designated as requiring the use of a respiratory protective device.
- f. MUST use grounded electrical equipment and hand tools which are in good condition.
- g. MUST observe all safety precautions and report unsafe conditions to the supervisor.
- h. MUST report all injuries immediately.
- i. TRUCK and EQUIPMENT operators MUST be absolutely certain that the path of movement is clear, particularly when they are backing up. The horn or other audible signal must be sounded while backing up. Buses with a passenger carrying capacity greater than 12 and 2-1/2 ton and larger trucks will use ground guides when backing.

F-2. Failure to adhere to this policy will result in an employee being subject to the following disciplinary actions.


- a. CIVILIAN: Failure to adhere to this policy may result in a civilian employee being subjected to discipline which, depending upon the facts in each case, can range from oral admonishment or written warning through reprimand and suspension to removal.
- b. MILITARY: Disciplinary action taken under the provisions of Article 92, Uniform Code of Military Justice, for failure to obey a lawful regulation or verbal or written order.

Shop supervisors have the responsibility to enforce this policy. Supervisors will document each employee violation by preparing a Notice of Safety Violation for Failure to Wear Protective Clothing and Equipment. This can be used as a basis for disciplinary action for repeated or serious violations.

F-3. THIS POLICY SHALL BE OBSERVED BY ALL EMPLOYEES.

FD Suppl 1 to AR 385-10

FOR THE COMMANDER:


ROBERT R. MACMASTER
Director of Information Management

DISTRIBUTION:

A

OFFICIAL:
RICHARD L. EDWARDS
LTC, TC
Deputy Installation Commander

DEPARTMENT OF THE ARMY
HEADQUARTERS FORT DEVENS
Fort Devens, Massachusetts 01433-5000
5 September 1989

Safety
FORT DEVENS HAZARD COMMUNICATION PROGRAM

SUMMARY. This regulation covers the implementation of the Hazard Communication Program. It describes unit responsibilities in terms of identifying chemical hazards, labeling chemical containers and training effected personnel.

APPLICABILITY. This regulation is applicable to all commands, units and activities on or under the jurisdiction of Fort Devens.

IMPACT ON THE NEW MANNING SYSTEM: This regulation does not contain any information that affects the New Manning System.

SUPPLEMENTATION: Local supplementation of this regulation and establishment of forms are prohibited, except upon approval of the Safety Office. Requests for exception, with justification, will be sent to Commander, Headquarters Fort Devens, ATTN: AFZD-SM, Fort Devens, MA 01433-5520.

SUGGESTED IMPROVEMENTS. The proponent of this regulation is the Office of Safety Management. Users are invited to send comments and suggested improvements on DA Form 2028 (Recommended Changes to Publications and Blank Forms) directly to Commander, Headquarters Fort Devens, ATTN: AFZD-SM, Fort Devens, MA 01433-5520.

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1. Purpose. This regulation prescribes Fort Devens policies and procedures to communicate information regarding chemical workplace hazards to all installation personnel.

2. References.

a. Required publications:

- (1) AR 40-5, Preventive Medicine.
- (2) AR 385-10, The Army Safety Program.
- (3) AR 700-141, Hazardous Material Information System (HMIS).
- (4) Section 1200, part 1910, title 29, Code of Federal Regulations (29 CFR 1910.1200) (Occupational Safety and Health Administration Hazard Communication Standard).

b. Related publications:

- (1) 29 CFR 1910, subpart Z, Occupational Safety and Health Administration Toxic and Hazardous Substances.
- (2) 29 CFR 1960, Occupational Safety and Health Administration, Basic Program Elements for Federal Employee Occupational Safety and Health Programs and Related Matters.
- (3) DOD 6055.1, DOD Occupational Safety and Health Program.

3. Explanation of Abbreviations and Terms. Abbreviations and special terms used in this regulation are explained in the glossary.

4. Responsibilities.

a. The Director of Safety Management will:

- (1) Manage and direct implementation of the Fort Devens Hazard Communication Program.
- (2) Develop, coordinate, and disseminate Army hazard communication policy and guidance to all Fort Devens activities.
- (3) Establish and maintain a written hazard communication program.
- (4) Monitor hazard communication program effectiveness.
- (5) Safeguard trade secret information drawn from restricted portions of the Hazardous Materials Information System.
- (6) Direct a formal hazard communication training program for military and civilian personnel, assisted by occupational health, supervisory personnel and others as required.
- (7) Coordinate the implementation of countermeasures to hazards associated with workplace chemicals and materials.
- (8) Evaluate the hazard communication program annually.
- (9) Conduct work area surveys to determine the presence of unsafe conditions.
- (10) Forward copies of Material Safety Data Sheet (MSDS) to user activities, Preventive Medicine, and the DEH Environmental Office.

b. The Directorate of Logistics (DOL) will:

- (1) Establish policy and procedures to implement logistical programs in support of Hazard Communication Program.
- (2) Ensure all MSDS received with chemical shipments are forwarded to the Safety Management Office, Box 52. In addition, furnish requester's Department of Defense Activity Address Code (DODAC) number so that the Safety Office can make appropriate distribution of MSDS.

c. The Medical Department Activity (MEDDAC, Preventive Medicine) will:

- (1) Provide technical medical advice to the Fort Devens Hazard Communication Program.
- (2) Establish procedures and programs to implement occupational health aspects of the Hazard Communication Standard (HCS).
- (3) Implement responsibilities defined in AR 40-5 and AR 385-10 in support of the HCS.

d. The Directorate of Contracting (DOC) will:

- (1) Ensure MSDS is provided by manufacturer for any chemical purchased for use by Fort Devens activities.
- (2) Ensure contractors working on Fort Devens submit a copy of their written Hazard Communication Program as part of their project submittal documents. The program should include copies of MSDS for all chemicals the contractor will be using on the job.
- (3) Ensure contractors are informed of any chemical hazards they might encounter while working in a Fort Devens facility. This can be accomplished during the pre-construction meeting when project proponents are present. It is the responsibility of the building occupant to maintain MSDS for all chemical hazards in his/her area.

e. Each activity will:

- (1) Appoint an individual (normally the Safety Officer) to coordinate the requirements of the Hazard Communication Standard.
- (2) Maintain a current Hazardous Chemical Inventory for all regulated materials within their work places.

(3) Ensure an MSDS is on file for each chemical listed in the Hazardous Chemical Inventory. MSDS's should be readily available for employees' use.

(4) Furnish the Safety Office with a copy of the MSDS for any newly obtained chemical.

(5) Ensure all affected employees receive training as outlined in paragraph 10. The Safety Office will provide the initial training for all current employees; however, each activity representative will then be responsible for training new employees. Training materials will be available through the Safety Office.

(6) Ensure all containers are properly labeled as outlined in paragraph 8.

(7) Prepare a Standing Operating Procedure (SOP) which identifies the use of chemical compounds, safe handling procedures and the protective clothing and equipment employees must use.

(8) Inform the Safety Office in writing of any new or significant change to processes or operations which may impact on the Hazard Communication Program.

(9) Be responsible for disposing of hazardous substances in accordance with (IAW) the Director of Engineering and Housing (DEH) Environmental Management Office's instruction.

(10) Be responsible for reporting any spills of hazardous substances to the DEH Environmental Office (ext 3002).

(11) Fill out and post the Federal Hazard Communication Training Program Facility/Agency Specific Information sheet at a location where employees normally report to work. A sample sheet is located at Appendix B.

5. Policy. All personnel potentially exposed to hazardous chemicals in the work area will be made aware of the hazards to which they are exposed and countermeasures or controls required to protect themselves. This includes personnel in nonappropriated fund, morale and welfare activities (e.g., autocraft, photo, woodworking, and ceramic craft shops), as well as those in non-military unique activities such as hazardous storage, motor maintenance, etc.).

6. Scope.

a. The requirements of this regulation do not apply to working conditions or workplaces regulated by other federal agencies exercising statutory authority as specified in Occupational Safety and Health Administration (OSHA) Hazard Communications Standard, 29 CFR 1910.1200.

b. This regulation does not apply to:

(1) Any hazardous waste regulated by the Environmental Protection Agency.

(2) Tobacco or tobacco products.

(3) Articles.

(4) Food, drugs, cosmetics, or alcoholic beverages in a retail store packaged for consumer sales.

(5) Food, drugs, or cosmetics intended for personal consumption by employees in the workplace.

(6) Consumer products provided they are used in the manner and approximate quantities that would be expected in a typical consumer application.

(7) Any drug regulated by the Food and Drug Administration, when it is in solid, final form for direct administration to the patient (tablets or pills).

c. Cutler Army Community Hospital (CACH) laboratory facilities are covered by the Hazard Communication Standard only to the extent that labels on incoming containers must not be removed or defaced; MSDS will be maintained and made accessible to employees; and employees must receive training on workplace chemical hazards as set forth in this regulation.

d. Employees who encounter nonroutine exposure to hazardous chemicals, such as office workers, will not be included in the hazard communication program. However, office workers whose jobs or activities involve routine exposure to hazardous chemicals will be included.

e. Contract employees performing work within Fort Devens facilities are covered by their employer's hazard communication program. Fort Devens will inform contractors of possible chemical hazards to which their employees may be exposed while working in installation facilities.

7. Workplace Hazard Evaluation.

a. A hazard evaluation of all workplaces will be conducted by the Safety Management Office at least annually to identify and evaluate use, storage and disposal of all hazardous chemicals in stock, on procurement, and currently in use.

b. A written hazardous chemical inventory will be prepared and updated as necessary by each activity.

c. Copies of the program and work area hazardous chemicals inventories will be kept at each work site and will be available to affected employees, their representatives, Department of the Army (DA) and Department of Labor officials. Upon request, hazardous chemical information, current protective measures in use, and copies of MSDS will be provided to contractors whose employees could be exposed to hazardous materials in DA work areas. Contractors whose operations could expose DA personnel to hazardous chemicals will provide equivalent information to the installation contracting office prior to introducing hazardous chemicals in areas where DA personnel are potentially exposed.

d. Tenant organizations will operate under the Fort Devens program.

8. Labeling.

a. All containers of hazardous chemicals in Army work areas will bear adequate hazard warning labels. Information will include an appropriate hazard warning and sufficient identification to match the contents to the proper MSDS.

b. Hazardous chemicals received from commercial suppliers are not required to be relabeled. Labels developed by those suppliers in accordance with OSHA's hazard communication standard are satisfactory.

c. No warning information, whether provided by manufacturers or locally produced, will be defaced or removed from a container of hazardous materials. If original warning information is found to be incorrect or inadequate the user will notify the manufacturer.

d. Empty containers will retain their identification until thoroughly decontaminated or properly disposed. Decontaminated containers will have warning labels removed before release for other uses. State and federal laws regulate the disposal of some hazardous chemical containers. Contact the DEH Environmental Management Office for additional information.

e. Existing stocks of hazardous chemicals marked in compliance with the requirements of the Hazard Communication Standard need not be relabeled.

f. Four situations are exempt from, or allow alternatives to, the labeling requirements:

(1) Containers labeled under other Federal laws need not be relabeled (see table 1-1).

(2) Portable containers into which hazardous chemicals are transferred from labeled containers, and which are intended only for the immediate use of the person performing the transfer, are exempt from labeling requirements.

(3) In laboratories, labels on incoming containers of hazardous chemicals will not be removed or defaced. In laboratories only, containers in use, such as test tubes or flask beakers, need not be labeled with an identity and hazard warning as defined by the Hazard Communication Standard.

(4) Alternative methods of labeling, such as signs, placards, and other written forms of warning, are permitted in lieu of affixing labels to individual stationary process containers.

Table 1-1
Examples of Labels Required By Other Agencies

Agency	Authority	Jurisdiction
Environmental Protection Agency	Federal Environmental Pesticide Control Act (*formerly FIFRA)	Insecticides Fungicides Rodenticides
Consumer Product Safety Commission	Federal Hazardous Substances Labeling Act	Hazardous and toxic household products
Food and Drug Administration	Fair Packaging and Labeling Act	Packaging and labeling of food, drugs, cosmetics, and medical devices
Bureau of Alcohol, Tobacco, and Firearms	Federal Alcohol Administration Act	Distilled beverages, wine, and malt beverages

*Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA)

9. Material Safety Data Sheets (MSDS)

a. Contents of any MSDS used on Fort Devens will meet or exceed the data requirements of OSHA Form 174 (M.S.D.S.). All elements of the MSDS will be completed.

b. The requirement for MSDS will be incorporated within the contract for all locally purchased and non-standard stock hazardous chemicals in accordance with AR 700-141.

c. If MSDS is not received with the shipment of a locally purchased hazardous chemical, the appropriate supervisor will contact procurement officials who will follow up with the supplier to obtain a satisfactory MSDS according to the procedures in AR 700-141.

d. Procurement officials will attempt to obtain safety and health hazard data on all locally procured hazardous chemicals.

e. Identification of a hazardous material and correct matching to its MSDS is required. Critical differences exist between similarly named chemicals and products. MSDS provided directly from suppliers will be reviewed by the appropriate supervisor and the Safety Office for completeness and accuracy.

f. MSDS shall, as a minimum, be maintained at a designated central location within each activity and at the Safety Office and the Preventive Medicine Office.

g. All personnel shall have ready access during each workshift to MSDS applicable to their work area. Accessibility will be achieved by placing copies in the immediate work area or by providing rapid response from a centralized MSDS file.

h. Occupational health and/or safety personnel will be available upon request to provide explanations of MSDS to supervisors and affected workers.

10. Training.

a. Training requirements and priority will be determined by the seriousness of the threat, likelihood of exposure and frequency of use. Current personnel must complete training within one year from the effective date of this regulation. Individuals who encounter nonroutine exposure to hazardous chemicals are exempt from this training requirement.

b. Training will include:

(1) The DOD Federal Agency Hazard Communication Training Program.

(2) An explanation of types of operations and hazardous chemicals used in an individual's workplace.

(3) A description of the requirements of the hazard communication standard, the location and availability of the installation's written hazard communication program, and how personnel can use and obtain chemical hazard information.

(4) An explanation of the potential physical and health hazards from chemicals in the work area.

(5) Protective measures including administrative and engineering controls, safe work practice guidelines, emergency procedures, and protective clothing and equipment.

(6) The meaning of work area hazardous chemical warning labels and explanation of MSDS and SOPs to ensure that materials are handled, stored, and disposed of IAW specified SOPs and regulations.

(7) Emergency evacuation and notification procedures.

(8) How to read and interpret an MSDS.

c. Hazard communication training will be integrated into all training curricula and shall be documented in writing by use of DD Form 1556-1. Records will be filed in the official personnel folder for the duration of employment plus 30 years.

Glossary

DA Personnel

Civilian personnel employed on a full-time, part-time, temporary, voluntary or seasonal basis and military personnel on active duty, active duty for training and/or temporary duty status.

Emergency Response Personnel

Individuals trained and tasked with duties at the site of chemical spills, accidents or other emergency events involving hazardous materials (e.g., firefighters, ambulance drivers, medics, security and emergency spill control personnel).

Exposure

State of being open and vulnerable to a hazardous chemical in the course of employment by inhalation, ingestion, skin contact, absorption, or any other course; includes potential (accidental or possible) exposure.

Hazard Chemicals

Materials containing chemicals or mixtures of chemicals the presence or use of which is a physical or a health hazard. Chemicals presumed to be hazardous are listed in:

- a. 29 CFR 1910 Subpart Z (chemicals regulated by OSHA).
- b. Threshold Limit Values for Chemical Substances and Physical Agents in the Work Environment, American Conference of Governmental Industrial Hygienist (latest edition).
- c. National Toxicology Program, Annual Report on Carcinogens (latest edition).
- d. International Agency for Research on Cancer Monographs (latest edition).
- e. 40 CFR 302.4, Designation of Hazardous Substances.

Hazard Warning

Words, pictures, symbols, or combination thereof, presented on a label or other appropriate form to inform of the presence of various materials.

Health Hazard

A chemical or physical agent for which there is significant evidence, based on at least one study conducted in accordance with established scientific principles, that acute or chronic health effects may occur in exposed employees. The term "health hazard" includes chemicals which are carcinogens, toxic or highly toxic agents, reproductive toxins, irritants, corrosives, sensitizers, hepatotoxins, nephrotoxins, neurotoxins, agents which act on the hematopoietic system, and agents which damage the lungs, skin, eyes, or mucous membranes. It also includes physical agents such as noise, ultraviolet, infrared, microwave and ionizing radiation.

HMIS

The Department of Defense Hazardous Materials Information System, an automated and microfilm database of manufacturers' Material Safety Data Sheets submitted by commodity managers of the military services. See AR 700-141 for control and use of HMIS.

Limited Release HMIS

A selection of MSDS in the HMIS which are protected by trade secrets provisions. Limited Release (LR) HMIS information is treated as "FOR OFFICIAL USE ONLY."

Military-Unique

Equipment and systems that are unique to the national defense mission, including the operation, testing, and maintenance procedures dictated by design configuration. Examples are military weapons, aircraft, ships, submarines, missiles and missile sites, early warning systems and sites, military space systems, ordnance, tanks, and tactical vehicles. Operations or workplaces that are uniquely military, such as field maneuvers; combat training; naval operations; military flight and missile operations; associated research, test, and development activities; and actions required under emergency conditions. Toxic chemical munitions/agents storage, maintenance and demilitarization.

Work Area

A room or defined space in a workplace where hazardous chemicals are produced or used, and where employees are present.

Workplace

An establishment at one geographical location containing one or more work areas.

Appendix A

HAZARDOUS MATERIAL INVENTORY

CHEMICAL	MANUFACTURER	USE POINT
Flux, Silver Solder, "Stay Silv"	J. W. Harris Co.	DEH, Refrigeration
Silver Brazing Alloy, "Stay Silv 15"	J. W. Harris Co.	DEH, Refrigeration
Wire Solder 50/50	J. W. Harris Co.	DEH, Refrigeration
Flux, Aluminum Soldering "Stay Clean"	J. W. Harris Co.	DEH, Refrigeration
Soldering Paste	Hercules	DEH, Refrigeration
Anti-freeze, Ethylene Glycol	Union Carbine	DEH, Refrigeration
Calclean	Calgon Corp.	DEH, Refrigeration
Pump Protector	Calgon Corp.	DEH, Refrigeration
Gasket Eater	Fredrickseal Inc.	DEH, Refrigeration
Never Freeze	Fredrickseal Inc.	DEH, Refrigeration
Polygasket Aerosol Primer	Fredrickseal Inc.	DEH, Refrigeration
Penetrating Oil	Shamrock Specialties Co.	DEH, Refrigeration
Belt Dressing	Fullwell Co.	DEH, Refrigeration
Heavy Duty Silicone Spray	Fullwell Co.	DEH, Refrigeration
Super Poxee	Watsco Co.	DEH, Refrigeration
Penetrating Fluid, R.E.	Watsco Co.	DEH, Refrigeration
Dehydrant, "Flo"	Watsco Co.	DEH, Refrigeration
Quick Metal	Loctite Corp.	DEH, Refrigeration
Penetrating Oil, "Stay Loose"	Brulin & Co., Inc.	DEH, Refrigeration
Flux, Super Aluminum Braze	Ben Miller & Co.	DEH, Refrigeration
"815 Mix" Cleaner	Brulin & Co., Inc.	DEH, Refrigeration
Antifreeze, Windshield Washer	Uni-Gard	DEH, Refrigeration
Wire Solder, 95/5	M.W. Dunton Co.	DEH, Refrigeration
Conveyor Chain Lubricant	Savory Equipment Co.	DEH, Refrigeration
Industrial Silicone Spray	OAK Materials Group	DEH, Refrigeration
Heavy Duty Silicone Spray	Fullwell Products Co.	DEH, Refrigeration
"Spragrip" Belt Dressing	A-Co Chesterton Co.	DEH, Refrigeration
Rust Inhibitor Spray	Holt Lloyd Corp.	DEH, Refrigeration
"Heavy Duty LPS 3"		
WD 40	WD-40 Co.	DEH, Sheet Metal
Cyclo Carb Cleaner	Cyclo Automotive Co.	DEH, Sheet Metal
Stay Loose	Brulin & Co., Inc.	DEH, Sheet Metal
Solvent Degreaser	Brulin & Co., Inc.	DEH, Sheet Metal
Bowlaide	Brulin & Co., Inc.	DEH, Sheet Metal
White Lube	Silvo Co.	DEH, Sheet Metal
Silicone Lubricant	Cotter & Co.	DEH, Sheet Metal
L.P.S. No. 3	L.P.S. Research Labs, Inc.	DEH, Sheet Metal
Carbureter Cleaner	Share Corp	DEH, Sheet Metal
Super Contact Adhesive	3C Co.	DEH, Sheet Metal
Plastic Roof Cement	Monsey Products	DEH, Sheet Metal
Flux, "Stay-Silv"	J. W. Harris, Co.	DEH, Sheet Metal
Flux Alloy	Weld Alloy Corp.	DEH, Sheet Metal
Flux Coated Brazing Rod	Uni Braze Corp.	DEH, Sheet Metal
Bowlaide	Brulin & Co., Inc.	DEH, Sheet Metal
Acetylene	UNK	DEH, Sheet Metal
Argon	UNK	DEH, Sheet Metal
Thin X Paint Thinner	Thin X	DEH, PM Shop
Adhesive	Grip-Alune	DEH, PM Shop
Mark loc Adhesive	Tarket	DEH, PM Shop
Wood Preservative	Cuprinol	DEH, PM Shop
Ceiling Tile Adhesive	H. B. Fuller Co.	DEH, PM Shop
Acetylene	UNK	DEH, PM Shop
Propane Gas	UNK	DEH, PM Shop
Epoxy Mortar Grout, HD 4000 ARR II	American Clean Tile	DEH, Mason Shop
Muriatic Acid	New England Chemical Co.	DEH, Mason Shop
Tile-N-Grout Cleaner	Sunshine Chemical Inc.	DEH, Mason Shop
Thoroguard	Standard Drywell Products	DEH, Mason Shop
Acid-R-Grout	L & M Mfg Inc.	DEH, Mason Shop
Joint Filler & Tile Grout	Syracuse Adhesive Co.	DEH, Mason Shop
Barrier Cream	Pase Corp	DEH, Mason Shop
Thorogrip	Thoro Systems Products	DEH, Mason Shop
AO 1700 Ceramic Tile Adhesive	American Clean Tile	DEH, Mason Shop
1227 Epoxy Coating Thinner	Tiffany Division	DEH, Mason Shop
Epoxy Sealer 100 Resin	DEVCON Corp.	DEH, Mason Shop
Epoxy Tile 8040-ET 40	Hultscrete Co., Inc.	DEH, Mason Shop

Gran-grip Solidifier
Grangrip Base
Drylock Clear Concrete Protector
Thoro Clear 777 Silicone
Deck-O-Seal Setting Agent
Deck-O-Seal Base
Octo-Solve Concentrate
Elmers Weather Tite Caulk
Spray Cling Plus

Acrylic Latex Additive 867
Propane
Lacquer, Aerosol
Stain & Wood Preservative
Paint

Paint Thinner
 Lacquer Thinner
 Marlite Adhesive
 Contact Cement
 Pipe Cement
 WD-40
 Penetrating Oil Type I
 Brake Fluid
 Plastic Wood
 FC-100 Adhesive
 Tiff-A-Lume
 Premier Asphalt Roof Coating
 Premier Plastic Roof Cement
 Flooring Adhesive
 C&C TFE-Lube
 DL-1501 Di-Sorbitane
 Banish Parts Washer
 DL-1310 Overtone
 NCC Sludge Solvent
 Caustic Soda Liquid
 Caustic Soda Flakes
 Anti-freeze
 PVC Cement
 BowlAide
 Ramout
 WD-40
 Chesterton Penetrating Oil
 Oster Cutting Oil
 Sprayon Paint
 BA-609 Drain Opener
 Wagonmaster Propane
 A-B-C Lag Kap
 Penefact Wetting Agent

Dry Lube
Chlorine Gas, 100%
Sodium Fluoride, 98%
Chlorine Bleach, 12%
Sodium Hexametaphosphate
Latex Paint

Oil Base Paint

MANUFACTURER

DEVCON Corp.
Thoro Systems Products
Silpro Masonry Systems
Hultscrate Co., Inc.
Sunshine Chemical
Specialties Inc.
Belzona Molecular
Belzona Molecular
United Gilsonite Labs
Standard Drywall Products
D.F.C. Co.
D.F.C. Co.
Brulin & Co., Inc.
Borden, Inc.
Sunshine Chemical
Specialties Inc.
H.B. Fuller Co.
Bernz O Matic
LHB Industries
Cuprinol
Cadillac Mfg
Pittsburg
Durant
ChemRay Coating Corp.
Growco
Ridgefield
CSD Conroe
CSD Conroe
Masonite Corp.
Tru Bond
Hercules Chemical Corp.
WD-40 Co.
Classic Chemical
NAPA
Boyle Midway Inc.
Borden Chemical Co.
American Lubricants Co.
Monsey Products Co.
Monsey Products Co.
3 C Co.
C&C Products Inc.
Drummond American Corp.
Drummond American Corp.
Drummond American Corp.
Nutmeg Chemical Co.
Sunshine Chemical Co.
Various
Old World Trading Co.
Hercules
Brulin & Co., Inc.
Ramco Chemical Co.
WD-40 Co.
A.W. Chesterton Co.
Teledyne Oster Bestoil
Sprayon Products Inc.
Sunshine Chemical Co.
Tempest
Fiberlock Tech Inc.
US Coatings Collaborative
Inc.
A.W. Chesterton Co.
New England Chemical Co.
Chem Tech Fluoride Div
E. F. King Co., Inc.
Cypress
Glidden Mfg.
Vilco Mfg.
Durant Mfg.
Cadillac Mfg.
Glidden Mfg.
Dutchboy Mfg.
Pratt & Lambert

USE POINT

DEH, Mason Shop
DEH, Mason Shop
DEH, Mason Shop
DEH, Mason Shop
DEH, Mason Shop

[illegible][illegible]

DEH, Plumbing Shop
DEH, Water & Sewer
DEH, Water & Sewer
DEH, Water & Sewer
DEH, Water & Sewer
DEH, Paint Shop

DEH. Paint Shop

CHEMICAL	MANUFACTURER	USE POINT
Paint Lacquer	Seymour Mfg.	DEH, Paint Shop
Paint Remover	LHB Industries	
	Savogran Co.	DEH, Paint Shop
	W. M. Barr & Co.	
Sign Paint	Sterling Clark Luntton	
Oil Base Stain	Consumers Paint Inc.	DEH, Paint Shop
	Min Wax Co., Inc.	DEH, Paint Shop
	Kalcon Coating	
	Coronado Paint Co.	
	Olympic	
Tints	Tenneco Chemical Co.	DEH, Paint Shop
	Kalcon Coating Co.	
	Sheffield Bronze Paint Corp.	
Pentrol Paint Remover	Flood Co.	DEH, Paint Shop
Varnish	D.S. Food Sales Inc.	DEH, Paint Shop
Stain Killer Primer	William Zinsser & Co., Inc.	DEH, Paint Shop
Sanding Liquid	Wilson-Imperial Co.	DEH, Paint Shop
Paint Thinner	Cadillac Paint Co.	DEH, Paint Shop
Denatured Alcohol	Octagon Process, Inc.	DEH, Paint Shop
Sanding Seales Lacquer	Cadillac Paint Co.	DEH, Paint Shop
Wax & Floor Finish Remover	Barrier Ind. Inc.	DEH, Paint Shop
Polyurethane	Clark Parker	DEH, Paint Shop
Turpentine	Octagon Products	DEH, Paint Shop
Lacquer Thinner	Octagon Products	DEH, Paint shop
Rust Inhibiting Primer	Pratt and Lambert	DEH, Paint Shop
Lemon Oil Polish	Gillespie	DEH, Paint Shop
Synthetic Enamel Thinner	CSD Conroe	DEH, Paint Shop
D.M.F. T-31	Cadillac	DEH, Paint Shop
Chloride Rubber	Cadillac	DEH, Paint Shop
Xylol Reducer	Cadillac	DEH, Paint Shop
Polyurethane	Cadillac	DEH, Paint Shop
Durd-Cryl Acrylic Sealer	Cadillac	DEH, Paint Shop
Acracad	Cadillac	DEH, Paint shop
P-46 Primer	Stanmark	DEH, Paint shop
Oil and Grease Emulsifier	Cadillac	DEH, Paint shop
Traffic Paint	Cadillac	DEH, Paint Shop
Drione	Fairfield American Corp.	DEH, Entomology
Malathion E.C., 57%	Octagon Process Inc.	DEH, Entomology
Cythion	American Cyanaid Ag. Div.	DEH, Entomology
Malathion 80%	Miller Chemical & Fert Corp.	DEH, Entomology
Knox Out	Whitemire Research Labs	DEH, Entomology
Diazinon E.C.	Octagon Process Inc.	DEH, Entomology
Ficam W.	Nor-AM Chemical Co.	DEH, Entomology
Ficam D.	Nor-AM Chemical Co.	DEH, Entomology
Pyrethrine 3%	Micro Gen Equipment Corp.	DEH, Entomology
Doom Milky Spore Disease	Fairfax Biological Labs	DEH, Entomology
Borid Boric Acid Powder	R-Valve Inc.	DEH, Entomology
Pest-Pro Ant & Roach Powder	Residex Corp.	DEH, Entomology
99% Boric Acid		
Drax Ant Gel	R. Valve Inc.	DEH, Entomology
Strike Insect Strips	Zoecon Corp.	DEH, Entomology
Safrothin E.C.	Zoecon Corp.	DEH, Entomology
Durshan L.O.	Dow Chemical Co.	DEH, Entomology
Baygone 2% Bait	Chemagro (Baychem Corp.)	DEH, Entomology
Demon W.P.	ICI Americas Inc.	
Maxforce Bait	American Cyananid Co.	DEH, Entomology
Sprayable Sevin		DEH, Entomology
Durshan T.C.		
Flytek Bait	Dow Chemical Co.	
Baygon I.S.E.C.	Zoecon Corp.	DEH, Entomology
Killmaster II	Mobay Chemical Corp.	DEH, Entomology
Gencor S-E	Positive Formulators Inc.	DEH, Entomology
Precor	Zoecon Corp.	DEH, Entomology
Sectrol	Zoecon Corp.	DEH, Entomology
Prentox	3M Co.	DEH, Entomology
Combat Bait	Prentiss Drug & Chemical Co.	DEH, Entomology
ENOZ Moth Balls	American Cyanamide Co.	DEH, Entomology
D-Plenothrin	Willert Home Products	DEH, Entomology
Whitmire PT-280 Orthene	Aerosol Co., Inc.	DEH, Entomology
Whitmire PT-3-6-10 Aerucide	Whitmire Research Labs	DEH, Entomology
Virginia Chemical V-23	Whitmire Research Labs	DEH, Entomology
Pratt Wasp & Yellow Jacket Spray	Technical Products Corp.	DEH, Entomology
Super Cold Kill Wasp Spray	Miller Chemical & Fert Corp.	DEH, Entomology
	Sunshine Chemical	DEH, Entomology
	Specialties	

Altosid Briquets
4 The Birds Repellent
Woodchuck Bombs
Protexide
Denatured Alcohol Type II
Flexicolor Developer, C-41
Stabilizer
Developer, D-76
Chromium Intensifier
Farmers Reducer
Indicator Stop Bath
Microdol-X Developer
Sodium Sulfate
Photo-Flo 600
Acetic Acid
Lacquer Thinner
Paint Thinner
Xylene, Tech
Tolvene, Tech
Organic Paint Remover
Aluminum Molding Compound
Epoxy Cement
Flexiglass Cement
Ammonia (Gas)
Enamel Paint
Universal Developer
ITEK Instacolor Activator
Paint

Paint Thinner
 Creost Oil
 Isopropyl Alcohol
 Adhesive Rubber And II
 Silicone Lubricant Spray
 Freeze Mist
 Retec Type "B"
 Tetrahydrofuran & Ketones
 Turpentine
 Simple Green
 Detergent GP
 Acetone & Butyl Acetate
 MAPP Gas
 Propane
 Oxygen
 Toluene, Methylene
 Acetone
 Silicone Paste Adhesive
 Syn-Rhr Liquid Adhesive
 Adhesive, Syn-Resin and Syn-Rbr
 Liquid
 Liquid Adhesive
 Denatured Alcohol

ICI Americas Corp
ICI Americas Corp
Bell Laboratories Inc.

American Fluoride Corp.
Bell Laboratories Inc.
American Cyanamide Co.
Dow Chemical Co.
Vertac Chemical Corp.
Union Carbide
Elanco Products Co.
Monsanto Co.
Monsanto Co.
O.M. Scott & Sons
O.M. Scott & Sons
E.I. Dupont
Fermenta Plant Protection
Co.
Zoecon Corp.
J.T. Eaton & Co., Inc.
Pucatello Supply Depot
Melco Lab Inc.
Warner-Graham & Co.
Kodak
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Kodak
Octagon Process, Inc.
CDS Conroe
Phipps Products Corp.
Phipps Products Corp.
George Senn Inc.
Wm Barr Co.
DEVCON Corp.
EPI Seal Co.
Industrial Poly Chemical
Northeastern Ammonia Co.
Unknown
ITEK
ITEK
Seymour Inc.
Chemray Coating Corp.
Enterprice Chem Coating Corp.
Provesco Paint Co.
Phipps Products Corp.
Standard Tar Products Co.
Cumbeland Swan
Steven Industry
Lawson
GE Electronics
RTI
Unknown
Unknown
Sunshine Makers
Lighthouse for the Blind
Dupont
Unknown
Unknown
Unknown
3M Co.
Union Oil Co.
Dow Corning Corp.
Northtech Adhesive Corp.
Goodyear Tire & Rubber Co.

3M Co.
AAPER Alcohol & Chem Co.

DEH, Entomology
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TSC, Photo Lab
TSC, Photo Lab
TSC, Photo Lab
TSC, Photo Lab
TSC, Photo Lab
TSC, Photo Lab
TSC, Photo Lab
TSC, Photo Shop
TSC, Photo Lab
TSC, Paint Shop
TSC, Paint Shop
TSC, Paint Shop
TSC, Paint Shop
TSC, Paint Shop
TSC, Mold Shop
TSC, Mold Shop
TSC, Mold Shop
TSC, Graphics Shop
TSC, Graphics Shop
TSC, Graphics Shop
TSC, Graphics Shop
Range Control, Maint
Range Control, Maint
p. Range Control, Maint
Range Control, Maint
Range Control, Maint
Range Control, Maint
TSC, Maint
TSC, Maint
TSC, Maint
TSC, Maint
TSC, Warehouse
TSC, Warehouse
TSC, Warehouse
TSC, General
TSC, Devices
TSC, Devices
TSC, Devices
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NWSB
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NWSB

NWSB .
NWSB

CHEMICAL

Cleaning Compound
Metal Pretreatment Coating Compound
Coating Kit 120
Corrosion Preventive Compound
Corrosion Resistant Coating
Chemically Treated Aluminum
Enamel Paint

Silicone Grease
Aircraft & Instrument Grease
Stencil Ink
Lacquer

Zinc Chromate Primer Coating
Silicone Compound
Syn Resin Enamel Thinner
Toluene
Methyl Ethyl Ketone
Grease Molybdenum Disulfide
Lubricant Solid Film S-749
Corrosion Prevention Compound
Plastilube Moly #3
Anti-Seize Compound
Grease Aircraft & Instrument
Grease Aircraft, MIL-6-81827A
Grease Aircraft, WTR
Penetrating Oil
Lubricating Oil, General Purpose
Low Temperature
Lube Oil Aircraft Turboshaft Engine
Lube Oil Aircraft Turb Eng Petro.
Hydraulic Fluid Fire Resistant
Hydraulic Fluid Petro Base
Driveshaft Coupling Lube for Bell
Helicopter

Methyl Ethyl Ketone
Naptha, Aliphatic
Anti-Freeze Ethylene Glycol
Cleaning Compound Engine Gas Path
Methanol
Isopropyl Alcohol
Tolulene Technical
Corrosion Prevention Compound
MIL-C-11796B
Corrosion Prevention Comp
MIL-C-10382C
Corrosion Prevention Compound
MIL-C-161730
Aeroshell Oil W
Multi-grade 15W50
Jet Fuel JP/4
AVGAS 100LL
Gasoline Unleaded
Fluid Anti-icing
De-icing
PD 680

Zinc Chromate Primer
Aircraft Lacquer
Fiberglass Repair Kit
Toluene
EA 934
EA 9309
Epoxy Resin
Epoxy Polyimide
Acetic Acid
Dyethelene Trimine
Epoxy Adhesive
Paint, Alky
Acrylic Enamel Paint
Aliphatic Polyurethane Thinner
Plexiglass Repair Kit
Removed Epoxy Paint Sys
Paint Remover

MANUFACTURER

Crown Industrial Products Inc.
Randoff Products Co.
Amchem Products Inc.
Penreco
Amchem Products, Inc.

Pratt and Lambert
Koppers Co.
Enterprise Chem Coatings Co.
General Electric Co.
Texaco Inc.
Marsh Stencil Machine Co.
LHB Industries
Ameron Industrial Coatings
Pratt & Lambert Co.
Down Corning Corp.
Phipps Product Corp.
Exxon Co.
Shell Chemical Co.
Royal Lubricants Inc.
F/M Corporation
Bulk Chemical Dist, Inc.
Warren Refining Division
Makoor Products Co.
Royal Lubricants, Inc.
Convoy Oil Corp
Royal Lubricants
American Writing Co.
Burman-Castrol Co.

Hatco Chemical Corp.
Royal Lubricants Co., Inc.
American Oil and Supply Co.
American Oil and Supply Co.
Syn-Tech LTD

CSD Inc.
CSD Inc.
Octagon Process Inc.
Rochem U.S. Inc.
Phipps Products Corp.
Phipps Products Corp.
Phipps Products Corp.
Valvoline Oil Co.

Steven Industries

Steven Industries

Shell Oil Co.

Any Major Refiner

Octagon Process Inc.

Triangle Refineries
Mineral Pigments Corp.
Koppers Co. Inc.
Ashland Chemical Co.
Allied Corp
Dexter-Hysol
Dexter-Hysol
Furane Products
Pratt & Lambert
Fisher Scientific
Shape Products Inc.
Armstrong Products
Everseal Mfrg
Pratt & Lambert
Phipps Products Corp.
H.N. Bailly Assoc.
Eldorado Chemical Co.
W.M. Barr & Co.

USE POINT

NWSB
NWSB
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NWSB

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NWSB
MAAF
MAAF
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MAAF

MAAF

MAAF

MAAF

MAAF

MAAF

DOL, A/C Maint
DOL, A/C, Sheet Metal
DOL, A/C, Sheet Metal
DOL, A/C, Sheet Metal
DOL, A/C, Sheet Metal
DOL, A/C, Sheet Metal
DOL, A/C, Sheet Metal
DOL, A/C, Sheet Metal
DOL, A/C, Sheet Metal
DOL, A/C, Sheet Metal
DOL, A/C, Sheet Metal
DOL, A/C, Sheet Metal
DOL, A/C, Sheet Metal
DOL, A/C, Sheet Metal
DOL, A/C, Sheet Metal
DOL, A/C, Sheet Metal
DOL, A/C, Sheet Metal
DOL, A/C, Sheet Metal
DOL, A/C, Sheet Metal
DOL, A/C, Sheet Metal

CHEMICAL

Polyurethane Paint
Methyl Ethyl Ketone
Naptha
Pro Seal Compound
MEK Peroxide
Corrosion Removing Compound
A/C Cleaning Compound
Hydraulic Fluid
Turbine Engine Oil
Starting Fluid
Battery Solution (Potassium Hydroxide)
Antifreeze

#10 Oil
#30 Oil
#80/90 Oil
#10W/30 Oil
Transmission Fluid

Silicone Brake Fluid
Battery Acid
Open Gear & Wire Rope Lubricant

Power Lube
Defroster Fluid
Gasket Cement
Starting Fluid
Brake Cleaner
Carb and Choke Cleaner
Insul Spray

SFD Lubricant
Four Way Action
Battery Cleaner

Battery Terminal Protector
Battery Terminal Cooling
Battery Spray
Gasket Remover
Freon

Corrosion Prev Compound

Electro Contact Cleaner
Greaseless Lubricant
LDS Super Cleaner Degreaser
Silicone Lubricant

MANUFACTURER

Dupont Co.
CSD Inc.
CSD Inc.
Goal Chemical
Pennwalt Corp.
Amchem Co.
Unknown
American Oil & Supply
Royal Lubricants Inc.
Ryrol Co.
Octagon Process Inc.
MacArthur Petroleum

CSP, Inc.
Consolidated Motor Oils
Borne Chemical
CSD, Inc.
Delta Petroleum Co.

General Electric Co.
Wright Chemical Corp.
Lawson Products, Inc.

Premier Industrial
Bulk Chemicals, Inc.
Fullwell Motor Products
Spray Products Corp.
Holt Lloyd Corp.
Fullwell Motor Products
Premier Industrial Corp.

Electrofilm, Inc.
Share Corp.
Fullwell Motor Products

Bowman & Barnes
Fullwell Motor Products
Fullwell Motor Products
Fullwell Motor Products
Dupont

Bulk Chemicals, Inc.

Holt Lloyd Corp.
Holt Lloyd Corp.
Holt Lloyd Corp.
Hold Lloyd Corp.

USE POINT

DOL, A/C, Sheet Metal
DOL, A/C, Maint
DOL, A/C, Maint
DOL, A/C, Maint
DOL, A/C, Maint
DOL, A/C, Maint
DOL, A/C, Maint
DOL, A/C, Maint
DOL, A/C, Maint
DOL, A/C, Maint
DOL, A/C, Battery Shop
DOL, IMMO
DOL, Wheeled Vehicle Rep
DOL, Fixed Industrials
DOL, Heavy Mobile Equip
Same As Above
Same As Above
Same As Above
DOL, IMMD
DOL, Wheeled Vehicle Rep
DOL, Fixed Industrials
DOL, Heavy Mobile Equip
Same As Above
DOL, IMMD, Battery Shop
DOL, IMMD
- Allied Trades
- Wheeled Vehicle Rep
- Fixed Industrials
- Heavy Mobile Equip
Same As Above
Same As Above
Same As Above
Same As Above
Same As Above
Same As Above
DOL, IMMD
- Allied Trades
- Wheeled Veh Rep
- Fixed Industrials
- Heavy Mobile Equip
- Small Arms & Weapons
- Canvas/Office Machine
- C & E
Same As Above
Same As Above
DOL, IMMD
- Allied Trades
- Wheeled Veh Rep
- Fixed Industrials
- Heavy Mobile Equip
- Battery Room
Same As Above
Same As Above
Same As Above
Same As Above
DOL, IMMD
- Fixed Industrials
- Heavy Mobile Equip
DOL, IMMD
- All Shops
Same As Above
Same As Above
Same As Above
Same As Above

CHEMICAL

Fault Finder Developer

Met-L-Chek Remover
Gasket Compound
Soil Guard
Electric Motor Cleaner
Wax Remover
Floor Wax

Lime Away
G.P. Cleaner
Solvent Degreaser
Slurry Washing Compound
Aerosol Lacquer
Lacquer
Enamel
Freezing Compound
Paint Thinner
Poison Pack Decon Kit
Electrostatic Plate Solution
Offset Blanket Restorer
Blanket and Roller Wash
Freon
Antifreeze
Paint
Paint Remover
Rubbing Alcohol
Cleaning Fluid
Lubricating Oil
Octo-Solve
Du Pan Cleaner
Electrolite
Spray Cleaner
Dri Kem
Pine Oil
Alodine 1001
Trailer Glitter
Propane Gas
Muriatic Acid
Liquid Chlorine
Gas Chlorine
Octo-Solve
Bowlaide
TSP
WD-40
Wood Glue
Stage Paint
Stypeeze
Crack Filler
Honing Oil
Varnish
Formula C Approach Conditioner
Aerosol Approach Conditioner
Aero-San Shoe Deodorizer
Lane Cleaner and Polish
Kwik-Patch Filler
Kwik-Patch Fast Set
+90 Clear Pin Dip
Golden Lane Cleaner
Total Lane Cleaner
Nu-Lac Pin Cleaner
Tap & Line Cleaner
Cal-Tastic

MANUFACTURER

Crown Industrial

Met-L-Chek Co.
Lock Tight
Share Corp.
Bowman
Hillyard Chemical
Spectrum Chemicals
Industrial Floor Finish
Barrier Inc.
Economic Lab
Bruling Inc.
Bruling Inc.
DuBois Chemical
LHB
Plasti-Kote
Far West Paint
Chem-Tronics
Packing Svc Co.
MSA Co.
Gestetner Corp.
Gestetner Corp.
Gestetner Corp.
Glo Corp.
Texas Oil Co.
Chemray Coating Corp.
Sterling Clark Lurton Corp.
Parke-Davis
Gestetner Corp.
Marvel Oil Co.
Brulin & Co.
DuBois Chemical
BASF Wyandotte Corp.
Bulk Chemical Co.
Thetford Corp.
Lighthouse for the Blind
Amchem
Camco Mfr Inc.
Suburban Propane
New England Chemical Co.
B. F. King
B. F. King
Brulin & Co.
Brulin & Co.
Savogran
WD-40 Co.
Elmer's
Iddings
Savograph
Savograph
Smith Whetstone
Unknown
DBA
DBA
DBA
DBA
Master Industries
Master Industries
Brunswick
Brunswick
Brunswick
Perry/Austen
Durex, Inc.
Calgon Vestal

USE POINT

DOL, IMMD
- Allied Trades
- Wheeled Veh Rep
- Fixed Industrials
- Heavy Mobile Equip
- Small Arms & Weapons
Same As Above
DOL, SSSC
DOL, SSSC
DOL, SSSC
DOL, SSSC
DOL, SSSC
DOL, SSSC
DOL, SSSC
DOL, SSSC
DOL, SSSC
DOL, SSSC
DOL, SSSC
DOL, SSSC
DOL, SSSC
DOL, SSSC
DPCA, Svcs, Advertising
DPCA, Svcs, Advertising
DPCA, Svcs, Advertising
DPCA, Auto Craft Shop
DPCA, Auto Craft Shop
DPCA, Rec Center
DPCA, Rec Center
DPCA, Rec Center
DPCA, Rec Center
DPCA, Rec Center
DPCA, Rec Center
DPCA, Rec Center
DPCA, Outdoor Rec
DPCA, Outdoor Rec
DPCA, Outdoor Rec
DPCA, Outdoor Rec
DPCA, Outdoor Rec
DPCA, Outdoor Rec
DPCA, Outdoor Rec
DPCA, Pools
DPCA, Pools
DPCA, Pools
DPCA, Pools
DPCA, Pools
DPCA, Entertainment
DPCA, Entertainment
DPCA, Entertainment
DPCA, Entertainment
DPCA, Entertainment
DPCA, Entertainment
DPCA, Entertainment
DPCA, Entertainment
DPCA, Bowling Alley
DPCA, Bowling Alley
DPCA, Bowling Alley
DPCA, Bowling Alley
DPCA, Bowling Alley
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DPCA, Bowling Alley
DPCA, Bowling Alley

True Green
Tersan 1991 DF
Formec 80

Aqua Gro "L" & Aqua Gro "S"
Subdue
Daconal 2787 Flowable Fungicide
Mether 30
Oftanal 2 Insecticide
Blazon
Banol
Drift Proof
Act 1 Dione TGF
Broad Spectrum Fungicide
Super Dorsband
457 Dorsband Insect Killer
MCPP/2,4-D
Broad Leaf Herbicide 2, 4-D
Weed-Rhap
LV-4-D 2,4-D Lovolatile Herbicide
Tordon/Oir Forestry Herbicide
K-O-G Weed Control
Milorganite Activated Sewage
Sludges 6-2-0
Green Fertilizer 22-0-16
Spray On - Wipe Off
Quatrasan II
Trophy Wood Seal
Pine Oil
Red Fluorescent
Touch Up Paint
Jet-O-Cide
Lubricant
Hydrocarbon
WD-40
Cyclo Silicone Spray
Superlube
LPS
Nybeco Paint
Zynolyte
Stencil Ink
Al231B Glue
Floor Prep
Strypeeze

Thompson & Fromby, Inc.
Klean Strip
Duncan Ceramics
Duncan Ceramics
Kodak
Kodak
Kodak
Kodak
Kodak
Kodak
Kodak
Kodak
James Austin Co.
Lighthouse for the Blind
B. Jadow & Sons
Share Corp.
Swestex
Minwax Co.
3 C Co.
Grumbacher
Unknown
Bayer Mobay Corp.

Rhone Poulenc Inc.
Agrochemical Division
Tom Irwin
Dupont
Gordon Professional Tuffe
Ornament Products
Aquatrols Corp of America
Ciba-Geigy
SDS Biotech Corp.
Wacleary
Mobay Corp.
Tom Irwin
Noram Chemical Corp.
Tom Irwin
Tucos/Upjohn Co. Tom Irwin
Scotts
Rockland Chemical Co.
Tom Irwin
Tom Irwin
Union Carbide
Vertac Chemical Corp.
Vertac Chemical Corp.
Dow Chemical Co.
Scotts Pro-Turf
Milwaukee Metropolitan
Sewerage District
Scotts Pro-Turf
Lighthouse for the Blind
Nevral Products
Hillyard Chemical Co.
American Writing Co.
Seymour of Sycamore
Nautilus
Brulin & Co.
LPS
Hysan Corp.
WD-40 Co.
Cyclo Automotive Inc.
Super Lube Inc.
Holt Lloyd Co.
NY Bronze Powder Co.
Zynolyte Products Co.
Universal Sign
B. F. Goodrich
Brulin & Co., Inc.
Sargran Co.

[illegible]

CHEMICAL

Deicing Fluid (Methanol)
Compass Radioa
Tritium
Freon-Air Conditioners
Pine Oil Cleaner
Detergent-GP (409)
Deodorant-GP
Toner
Cleaning Solvent Type 2
Trichloroethane, Type 3
Electric Motor & Contact
Lube Oil, Engine
Lime-A-Way
Electric Cleaning Comp
Alcohol, Deneatured
Pine Oil Cleaner
Lacquer
Detergent GP
Type Cleaner
Scouring Cream
Furniture Polish
Cleaner Spray
Blue Lacquer Paint
Solvent Degreaser
Enamel Spray
Paint Spray
Thinner
Lubrication Oil
Floor Wax
Ammonia
Trichloroethane 1,1,1
Isopropanal
Cleaner & Anti-Static
Petroleum Dist & Ammonia
Stop Bath #33
Fixer, #24
Developer
Developer #55
Bestine Solvent and Thinner
Best-Test Paper Cement
Krylon Workable Fixatif
Kleer Clear Aerosol
ISO Rubbing Alcohol
Denatured Alcohol
Plastic-Kote
Detergent, GP
Liquid Developer
Glass Cleaner
Detergent, GP
Disinfectant
Adhesive, Wood
Brasso
Raid Insecticides
Anti Static Solution
Halon Fire Extinguisher
Lime Away
Cleaner
Floor Sealer
Non Static Screen Cleaner
Type Cleaner
Bowl & Porcelain Cleaner
Batteries
Toner
Paint Remover
Lacquer Thinner

MANUFACTURER

Pyrill Comp.
Unknown

Dupont
Lighthouse for the Blind
Lighthouse for the Blind
Lighthouse for the Blind
Canon Inc.
Airosol Co.
Bulk Chemical
Fullbell Motor Products
Consolidated Motor Oils
Economic Labs
Bulk Chemical
Midwest Grain Products
Lighthouse for the Blind
LHB Industries
LBB Industries
American Writing Ink Co.
Crative Chemical Co.
Johnson Wax
Brulin Co.
Seymour & Sycamore Inc.
Brulin & Co.
AAFE
National Aerosol Products
Phipps Corp.
American Writing Ink
Masury Columbia Co.
Armor Dial Inc.
American Writing Ink Co.
LHB Ind
Prime Chem Co., Inc.
Airwick Industries
Kodak Co.
Kodak Co.
Kodak Co.
Kodak
Union Rubber Co.
Union Rubber Inc.
Borden Inc.
American Writing Ink
Diamond Drug Inc.
Aaper Alcohol and Chem Co.
Plasti-Kote Co., Inc.
LHB Industries
Kodak
LHB Industries
LHB Industries
LHB Industries
Chemical Commod Agency
Airwick Industries Inc.
S.C. Johnson & Son, Inc.
K-Mart
Amerex
Economic Lab
Brulin Co.
Sterling Clark Lurtin Co.
Prime Chemical Co.
American Writing Ink Co.
Peabody Paper Ind Supply
Everready
Royal
W.M. Barr Co.
GSA Dist

USE POINT

USAISD, SS, PBO
USAISD, SS, PBO

USAISD, SS, PBO
USAISD, SS, PBO
USAISD, SS, PBO
USAISD, SS, PBO
USAISD, SS, PBO
USAISD, MCD, P-12
USAISD, MCD, P-12
USAISD, MCD, P-12
USAISD, MCD, P-12
USAISD, MCD, P-12
USAISD, MCD, P-12
USAISD, MCD, P-12
USAISD, MCD, P-12
USAISD, MCD, P-12
USAISD, MCD, P-12
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USAISD, MCD, P-12
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USAISD, MCD, P-12
USAISD, MCD, P-12
USAISD, MCD, P-12
USAISD, MCD, P-12
USAISD, MCD, P-12
USAISD, MCD, P-12
USAISD, MI-DE, P-12
USAISD, MI-DE, P-12
USAISD, MI-DE, P-12
USAISD, MI-DE, P-12
USAISD, DOTD, P-12 PUB
USAISD, DOTD, P-12 PUB
USAISD, DOTD, P-12 PUBS
USAISD, DOTD, P-12 PUBS
USAISD, DOTD, P-12 PUBS
USAISD, DOTD, P-12 PUBS
USAISD, DOTD, P-12 PUBS
USAISD, DOTD, P-12 PUBS
USAISD, DOTD, P-12 PUBS
USAISD, DOTD, P-12 PUBS
USAISD, DOTD, P-12 PUBS
USAISD, DOES T-1643/1644
USAISD, DOES T-1643/1644
USAISD, DOES T-1643/1644
USAISD, DOES T-1643
USAISD, DOES T-1643/1644
USAISD, DOES, T-1643
USAISD, DOES, T-1643
USAISD, DOES, T-1643
USAISD, DOES, T-1643
USAISD, DOES T-1643/1644
USAISD, DOES T-1643/1644
USAISD, DOES T-1643/1644
USAISD, DOES T-1643/1644
USAISD, DOES T-1643/1644
USAISD, DOES, T-1643
USAISD, DOES, T-1643
USAISD, SS, Fac Br
USAISD, SS, Fac Br.
USAISD, SS, Fac Br.

AMYL Acetate

Brake Fluid
Break Free

Octagon Process Inc.
Poly Research Corp.
Unknown
Unknown
Old World Trading Co.
CSD, Inc.
Octagon Process Inc.
Poly Research Corp.
Old World Trading Co.
Unknown
Octagon Process Inc.
Convoy Oil Corp.
Unknown
Unknown
Unknown
Battenfeld
Battenfeld
Shell Oil Co.
Battenfeld
Octagon Process Inc.
Battenfeld
Delta Petroleum Co., Inc.
CSD Inc
Crown Oil & Chemical Co.
Burmah-Castrol Inc.
Battenfeld
Octagon Processing Inc.
Dow Corning Corp.
Makeer Products Co.
Pratt & Lambert Mfg.
Turner Co.
Pyroil Co.
Continental Chemical Corp.
Old World Trading Co.
Octagon Process Inc.
Phillips Process Co.
Packaging Service, Inc.
Battenfeld
Delta Petroleum Co., Inc.
Davis Howland Oil Corp.
Battenfeld
CSD Inc.
Battenfeld
CSD Inc
Battenfeld
Battenfeld
Octagon Process Inc.
Quick Start
Coleman
Imperial Oil Co.
Unknown
Unknown
D.A.
Unknown
Octagon Process Inc.
Octagon Process Inc.
L.B. Allen
CML Commodities Agency Inc.
Mallinckrodt Inc.
Union Carbide
Multronics Inc.
Octagon Process Inc.
NAPA
Makoor Prod. Co.
Phipps Products
Royal Lubricants Co.
Break Free Div.

[illegible]

CHEMICAL	MANUFACTURER	USE POINT
Calcium Hypochlorite	Olin Mathieson Chemical Co.	39th Eng, NBC Rooms
Cleaner, G.P.	Chem. Comp. Corp.	
Coating Solution (Conathane)	Brolin & Company Inc.	39th Eng, Latrines
Corrosion Inhibitor	Conap	39th Eng, Maint Shops
	Alcon Chemicals	39th Eng, NBC Rooms
Detergent	The Cortec Corp.	
Dextron II	Lighthouse for the Blind	39th Eng, Latrines
	Delta Petroleum Co.	39th Eng, Maint Shops
Diesel Fuel Ice Inhibitor	Octagon Process Inc.	
	Phipps Products	39th Eng, Maint Shops
	Octagon Process Inc.	
Dimethylsilicone	Sherwin Williams	39th Eng, NBC Rooms
Disinfectant	Lighthouse for the Blind	39th Eng, Latrines
DS-2 Decon Solution	All Ban Enterprises Inc.	39th Eng, NBC Field
	Pioneer Chemical Co., Inc.	Supply Annex
	Poly Research Corp.	
Epoxy-Polyamide Coating	Woolsey	39th Eng, Maint Shops
Ether	The Cooper Group	39th Eng, Maint Shops
	Turner Mfg.	
Floor Polish Remover	MSCI Ltd	39th Eng, Maint Shops
GAA	Battenfield Corp.	39th Eng, Maint Shops
Hand Cleaner	Makoor Products Co.	39th Eng, Maint Shops
	Vita-Erb Ltd	
Hand Cleaner, Waterless	Makoor Products Mfg. Co.	39th Eng, Maint Shops
IM-174 PD Radiacmeter	Canadian Admiral Corp.	39th Eng, NBC Rooms
Lotion, Hand Cleaner	Permi Klene Co.	39th Eng, Maint Shops
Mark I, Antidote Kit, Nerve Agent	Survival Technology Inc.	39th Eng, NBC Field
		Supply Annex
Methanol	Phipps Products	39th Eng, Maint Shops
MX-7338/PDR-27R Radioactive Test Sample	Multronics Inc.	39th Eng, NBC Rooms
M8 Detector/Identifying Paper	Anachemia Limited	39th Eng, NBC Rooms
M9 Detector Paper	Anachemia Canada Inc.	39th Eng, NBC Rooms
M13 DAP	All-Bran Enterprises	39th Eng, NBC Field
		Supply Annex
M43A1 Chemical Agent Detector	Brunswick Corp.	39th Eng, NBC Rooms
M58A1 Decon Kit (Training)	Mine Safety Appliances Co.	39th Eng, NBC Rooms
M72A2 Chemical Agent Identifier (Training)	Chemical Compounding Corp.	39th Eng, NBC Rooms
M256 Chemical Agent Identifying Kit	Bendix	39th Eng, NBC Field
		Supply Annex
M256 Chemical Identifying Kit (Training)	Chemical Compounding Corp.	39th Eng, NBC Rooms
M258A1 Decon Kit	Chemtronics Inc.	39th Eng, NBC Field
	Mine Safety Appliances Co.	Supply Annex
M272 Water Testing Kit	Chemical Comp. Corp.	39th Eng, NBC Rooms
Oil, Penetrating	Dri-slide Inc.	39th Eng, Maint Shops
Orthotolidine-Dihydrochloride	Chemical Comp. Corp.	39th Eng, NBC Rooms
Oil, 2 Cycle	Ralph Shrader Inc.	39th Eng, Maint Shops
Oil, 10w	Battenfield Corp.	39th Eng, Maint Shops
	Imperial Oil Co.	
Oil/HDO 30	Consolidated Motor Oils	39th Eng, Maint Shops
Oil, 80-90w	Battenfield Corp.	39th Eng, Maint Shops
	Imperial Oil Co.	
Oil, 85-140w	Mobil Oil Co.	39th Eng, Maint Shops
Paint, Enamel	Durant Paints	39th Eng, Maint Shops
Paint, Enamel-Alkyd	Chemray Coatings Corp.	39th Eng, Maint Shops
	Everseal	
	Pratt & Lambert Mfg. Contr.	
Paint, Enamel (Floor, Deck)	Enterprise Chemical Coatings Corp.	39th Eng, Maint Shops
Paint, Latex	Chemray Coatings Corp.	39th Eng, Maint Shops
	Graham Paint & Varnish	
	Cadillac Varnish Co.	
	Pratt & Lambert Mfg. Contr.	
Preservative Coating	L.B. Allen	39th Eng, Maint Shops
	Everseal Mfg. Co., Inc.	
Riot Control Agent (CS)	Unknown	39th Eng, NBC Rooms, Field Supply Annex

Appendix B

FEDERAL HAZARD COMMUNICATION TRAINING PROGRAM
FACILITY/AGENCY SPECIFIC INFORMATIONFacility

- . Name
- . Location: Bldg

Safety Industrial Hygiene and Occupational Health Office(s)

- . Location: Safety Office, P-2
- . Telephone number: 2440/3971
- . Location: Occupational Health, Preventive Medicine
- . Telephone number: 2459/3148
- . Location:
- . Telephone number:

Material Safety Data Sheets

- . Location:
- . Telephone number:
- . How to obtain copies: Contact supervisor.

Hazardous Chemical Inventory

- . Location:
- . Telephone number:

Facility Hazard Communication Program

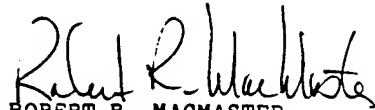
- . Location:

Emergency Telephone Numbers

- . Spill: 2220 Fire Dept/3002 Environmental
- . Leak: 2220 Fire Dept
- . Fire: 2117
- . First aid: 6816 (Ambulance)

FD Reg 385-1

FOR THE COMMANDER:



ROBERT R. MACMASTER
Director of Information Management

DISTRIBUTION:

A

OFFICIAL:
JOHN C. ANDRLE
Colonel, AG
Chief of Staff

DEPARTMENT OF THE ARMY
HEADQUARTERS FORT DEVENS
Fort Devens, Massachusetts 01433-5000
9 August 1991

Facilities Engineering
FIRE PROTECTION AND PREVENTION

SUMMARY. To provide an active Fire Prevention and Protection Program that will outline precautionary measures for fire prevention and eliminate the major hazards that may be found within the scope of activities on Fort Devens and the off-post satellites.

APPLICABILITY. This regulation applies to all military, U.S. Army Reserve Components, National Guard, civilian, dependent and transient personnel assigned or attached to Fort Devens. The primary intent of this regulation is the establishment of policies and procedures to control, prevent and extinguish fires. The secondary intent is provision of safeguards designed for minimum interference with operations providing maximum protection against injury and the loss of property by fire.

IMPACT ON NEW MANNING SYSTEM. This regulation does not contain information that affects the New Manning System.

SUPPLEMENTATION. Local supplementation of this regulation and establishment of forms is prohibited, except upon approval of the Director of Engineering and Housing. Requests for exception, with justification, will be sent to Commander, Headquarters Fort Devens, ATTN: AFZD-DEF, Fort Devens, MA 01433-5100.

SUGGESTED IMPROVEMENTS. The proponent of this regulation is the Director of Engineering and Housing. Users are invited to submit comments and suggested improvements on DA Form 2028 (Recommended Changes to Publications and Blank Forms) directly to Commander, Headquarters Fort Devens, ATTN: AFZD-DEF, Fort Devens, MA 01433-5100.

CHAPTER 1

GENERAL

1-1 Responsibilities. The following directorates and sections have the responsibility to provide or assist in the Fire Protection and Prevention Program.

a. The Installation Commander is responsible for ultimate control and conduct of the Installation Fire Protection and Prevention Program in accordance with (IAW) AR 420-90.

b. The Directorate of Engineering and Housing (DEH) is the Installation Fire Marshal and has the responsibility of the Fire Protection and Prevention Program as outlined in AR 420-90 and MACOM directives.

c. The Installation Fire Chief is directly responsible for the supervision and management of all operations within the fire department. Additional responsibilities are as follows:

(1) The Fire Chief will ensure that a quality fire protection and prevention program is developed and enforced to protect Army human and property resources.

(2) The Fire Chief will ensure that all installation facilities on and off post are inspected regularly (IAW AR 5-9) for fire hazards, fire system deficiencies and to ensure that all such equipment is in good working order.

(3) The Fire Chief will ensure that the public receives fire prevention training as needed and provide timely notices of fire hazards and deficiencies.

(4) The Fire Chief will ensure that all fire suppression and operational equipment is in good working order.

(5) The Fire Chief will coordinate with the Director of Safety Management on matters of mutual concern.

d. The Assistant Fire Chief will perform duties as prescribed by the Fire Chief and will be responsible for actions of the Fire Department in the absence of the Fire Chief.

e. The Installation Fire Inspector will be responsible to the Fire Chief for the conduct of the Fire Prevention Program.

(1) The Fire Inspector will ensure that all facilities on and off post are inspected on a regular basis in accordance with AR 420-90 and AR 5-9. This includes all fire protection, detection and suppression equipment.

(2) The Fire Inspector will review the fire protection programs of all military units and directorates assigned to Fort Devens.

(3) The Fire Inspector will provide fire prevention training to any person, group, or organization to eliminate the potential for fire.

(4) The Fire Inspector will provide timely notices on fire hazards, trends, and appliance recalls.

(5) The Fire Inspector will provide guidance to the Fire Chief on new construction, existing facilities, and work requests that will affect the fire safety of installation facilities.

(6) The Fire Inspector will assist the Fire Chief in the investigation and preparation of fire reports for all fires under DOD Directive 6055.7-M.

(7) The Fire Inspector will keep up to date with all applicable fire protection and construction guidance and regulations to provide fire safe facilities on and off Fort Devens.

f. Commanders and directors of units and activities on Fort Devens will be the organizational Fire Marshal. They will appoint fire wardens for each building under their control in accordance with AR 420-90.

(1) Fire Marshals and Wardens will inspect their facilities regularly for fire hazards. Fire hazards may be reported by telephone (ext 2220/2261), in writing, or by visiting the Fire Department (building 3500). The Fire Prevention Section has facility checklists for various facilities usage.

(2) Fire Marshals will coordinate with the Fire Department to conduct regular fire evacuation drills. This training will familiarize personnel within the facility required evacuation procedures to follow in case of a fire.

(3) Fire Wardens will ensure that fire evacuation plans and all pertinent fire prevention information is posted in areas so employees can practice evacuation procedures.

g. Military Family Housing occupants will assume the responsibility of keeping their homes fire safe. The Fire Department will conduct fire inspections of homes only as a courtesy unless their homes are used for family child care IAW AR 608-10. The Family Housing Manual has information on how residents can keep their homes fire-safe.

h. Support Agencies.

(1) The Chief, Operations, Utilities and Maintenance, Buildings and Grounds, will inform the Fire Department of all matters concerning facility usage, blocked roads, fire detection/suppression system outages, and hydrants out of service or repair.

(2) Engineering craftsmen will respond upon request of the senior firefighter on the scene of an incident to assist in utility shutdown, water problems, and other requests under the craftsmen's jurisdiction.

(3) U.S. Army Medical Department Activity (MEDDAC), Cutler Army Community Hospital personnel will respond upon request by the senior firefighter to provide medical assistance on the scene of an emergency.

(4) The Provost Marshal Office will provide traffic control at the scene of an emergency to keep vehicles and personnel from interfering with fire department operations.

CHAPTER 2

FIRE REPORTING PROCEDURES

2-1. When a fire occurs, timely reporting of the fire will save lives and property.

a. The first action that must take place is the immediate evacuation of the building.

b. Call the Fire Department by dialing ext 2117 for Fort Devens facilities and 796-2117 for housing residents or on pay phones.

c. Give the following information to the alarm room operator.

- (1) Building number, street number, and or area.
- (2) Type of fire (size), building, shack, aircraft, auto, etc.
- (3) Your name and telephone number.

(4) Remain on the telephone until the alarm room operator gives the caller further instructions.

d. Sound the local alarms installed (if any), if no alarm, shout loudly FIRE! FIRE! FIRE!. Then assist all others to evacuate as quickly as possible.

e. If fire is small, try to fight the fire with fire extinguishers available. Use the appropriate fire extinguisher. (See para 2-4)

e. Ensure that all lights and ventilation equipment are shut down and off, close all doors and windows. This should be done only if you are not in immediate danger. This will stop any spread of the fire.

g. Stand by the outside area until firefighters have arrived and direct them to specific location. The senior occupant of the facility should ensure that all personnel have evacuated, if not report to senior firefighter on scene to alert rescue personnel.

h. Military personnel suspected of tampering, vandalizing, removing detectors, or falsely activating fire alarm systems may be prosecuted under provisions of the Uniform Code of Military Justice (UCMJ). All others may be prosecuted under applicable state or federal laws.

i. Do not remove fire extinguishers from facility.

2-2 Building Evacuation Floor Plan and Procedures. Each facility fire warden will have an evacuation plan posted in the common areas of all facilities under their control. They will brief all new employees and personnel on all the fire evacuation procedures. Each organization shall prepare a fire prevention Standing Operation Procedure (SOP) for evacuation procedures and the elimination of fire hazards within their respective facilities.

a. Each evacuation plan will show the following:

- (1) Building number and floor level.
- (2) Location of principal exits, fire extinguishers, smoke/heat detectors, standpipes stations, manual activation devices and unique features of facility.
- (3) Primary routes will be shown in red and secondary routes will be in green or other color.
- (4) Fire reporting number applicable to your facility.
- (5) Name and telephone number of area/unit fire wardens.

b. Fire evacuation drills will be conducted monthly at hospitals, school/day care centers and child care provider homes.

c. Fire evacuation drills will be conducted quarterly for all other facilities in which personnel work every day.

2-3. There are four classes of fires that can occur in facilities on Fort Devens. They are as follows:

- a. Class A - Wood, paper, rags and trash.
- b. Class B - Flammable liquids, gases, solvents, oils and paints.
- c. Class C - Energized electrical equipment, motors, computers, stereos, televisions, etc.
- d. Class D - Combustible metals such as magnesium, sodium, lithium and beryllium. This type of fire can be very dangerous due to the metal's instability and requires a special fire extinguisher.

2-4. Fire extinguishers come in various types, sizes and agents. They must be used on the proper type of fire or injury could occur (read the label). They are as follows:

- a. Pressurized water extinguisher will be used on Class A fires only. Never use on electrical equipment.
- b. Carbon Dioxide (CO₂) fire extinguishers will be used on Class B and C fire only. Never use on computers as explosion of CRT screens will occur. This type of extinguisher has no gage and must be weighed annually.
- c. Dry chemical agents can fight fires of A, B, C class or B, C class. There are many types of extinguishers, so utilize according to labels on the extinguisher.
- d. Halon Agents are the newest of firefighting agents. They are very effective and leave no residue after activation. Computers and expensive electrical equipment should have Halon fire extinguishers. You do not need one extinguisher per computer. Caution: Read the warning label on the fire extinguisher to determine the hazards associated with using this type of agent in your facility.
- e. All fire extinguishers will be inspected regularly and will be exchanged or turned-in to building 1400. They are installed in accordance with NFPA standard 10 and Department of the Army guidance. Exchange guidance may be found in Fort Devens Pamphlet 710-2.

CHAPTER 3

FIRE PREVENTION PROGRAM

3-1. The objective of the Fire Prevention Program is to eliminate the hazards that cause fire. To reduce fire loss the Fire Prevention Section will assist in educating the installation of fire hazards, enforce the current regulations for fire prevention and develop recommendations to engineer facility deficiencies.

3-2. The inspection process starts with the facility folder so that the inspector will understand what type of facility is to be inspected. The following DA Forms are used to conduct the fire inspection.

- a. DA Form 5381-R (Building Fire Inspection). This Form will be completed to describe the facility and its components (i.e., fire extinguishers, hazards, and systems.) Only one copy of this form should be in the folder.

- b. DA Form 5382-R (Hazard/Deficiency Inspection Record). This form will be used if fire hazards are discovered and not "correctable on the spot". This form comes bonded together in three copies with carbon. Fire Inspectors will fill out the form and give the original to the building manager, the second copy will go into the folder, and the third copy will be turned in to the Fire Prevention Section for follow-up. Hazards must be corrected within three working days or if many hazards exist, two weeks. The Installation Fire Inspector will be notified of facility deficiencies which will require service orders or work orders to eliminate the deficiency.

- c. If no hazards exist, the fire inspector and fire warden will sign or initial the Fire Inspection tracking chart in the beginning of the folder. Fire Wardens will receive instructions on how to eliminate the fire hazards.

3-3. The frequency and types of fire inspections can be classified as high or low risk. High risk facilities will be inspected by the Installation Fire Inspector and conducted monthly or quarterly. Low risk fire inspections will be conducted by fire fighters on a quarterly or semi-annual basis. AR 420-90 provides guidance but most installation fire chiefs determine the individual frequencies. Special fire inspections are to be conducted by the Installation Fire Inspector (i.e., Command Inspection Program, Child Care Evaluation, Home (FCC) Inspections)

CHAPTER 4

FIRE PROTECTION/PREVENTION IN FACILITIES

4-1. There are many types of facilities on Fort Devens. This section will be used to describe them, set standards for their operation and the fire hazards associated with the facilities.

4-2. Places of public assembly are areas that have been determined to be used by the public on an everyday basis. Special attention is paid to the life safety factor because patrons may not know where exits are located due to the configuration of the facility.

a. All places of public assembly will be constructed and renovated in accordance with NFPA 101 (Life Safety Code).

b. The occupant load for facilities will not be exceeded unless approved by the Installation Fire Chief.

c. All exit doors will be installed in accordance with Life Safety Code 101, will be plainly marked and open in the direction to the outside of the facility. Seating in these facilities will provide clear access to exits and will not block any portion of the passageway.

d. Exits will not have hasp type locks installed. Exits will not be blocked, locked or changed from its intended use as an exit. If security requirements require such locking devices, the fire department will be notified to review special arrangements.

e. Curtains, screens, drapes, lampshades and temporary decorations will be constructed and/or treated to be non-combustible. Prior approval for the use of temporary decorations is required for public assembly facilities.

f. Emergency lights will be installed throughout the facility to provide lighting during power outages.

g. Before a public assembly facility is closed for operation, the facility manager will conduct a fire prevention inspection. The Fire Prevention Section has a checklist to be used during this inspection. When the inspection is completed, the manager will notify the Fire Department at extension 2220 and give the alarm room operator their name and facility number. The alarm room operator will give the person calling the closing number (randomly chosen) and will annotate this information on FtDevFm 212. Fire prevention personnel will spot check closing inspections to ensure compliance with this requirement.

h. Managers of all public assembly facilities will ensure that all employees receive periodic fire prevention training.

i. All exits will be clear of ice, snow and vegetation.

4-3. Open messes, cafeterias, snack bars and dining facilities will be constructed and operated in accordance with NFPA Standard 96 and Army directives. Special attention must be directed in keeping grease laden vapors from causing fires. Other requirements are as follows:

a. Kitchen hood filters will be in place whenever food is cooking and all areas will be cleaned on a regular basis (minimum-weekly). An extra set of filters will be available within the facility.

b. All ventilation systems will be operating during cooking and will be cleaned IAW NFPA 96 (semi-annually).

c. If exhaust hood fans and/or extinguishing systems are not operating, all cooking will cease until repaired.

d. Ensure that all manual activating devices for fire extinguishing systems are not blocked and are in operation.

4-4. Theaters present some special hazards and are outlined as follows:

a. Theater personnel will check exits prior to each show, to ensure that exits are lit properly and operate freely.

b. Smoking is prohibited in theaters at all times except in lounge or office areas. Smoking areas will be provided with adequate receptacles to dispose of smoking materials safely.

c. Theater personnel will ensure that all patrons are seated, aisles are kept clear and the occupancy capacity is not violated.

d. Whenever a fire is discovered, the projectionist will turn on house lights, shut down projector and will assist in the evacuation of patrons from the facility.

4-5 General Procedures.

a. All facilities will ensure that all trash containers are emptied regularly and as necessary to eliminate fire hazards.

- b. Smoking materials will be controlled in designated areas as prescribed by Army directives and local policies. Ash trays of non-combustible material and metal "butt" cans will be provided to control smoking materials. Do not mix with trash receptacles.
- c. Inspect all cushions to couches and chairs to remove any cigarette material.
- d. Ensure that all employees in all facilities used every day are knowledgeable of fire evacuation procedures, exits and associated fire hazards.
- e. All office equipment, electrical appliances and computer systems must be shut-down before the facility is closed for operation except those that must maintain continuous operation.
- f. Whenever a facility has been reopened, renovated or changed function, the facility manager will notify the fire department to review fire protection and prevention procedures.
- g. Personnel will not be allowed to sleep in non-quarters type facilities unless approved by the Installation Fire Chief and Fire Marshal.
- h. Attics, crawl spaces, and unoccupied basements will not be used for any purpose.
- i. Utility rooms within facilities will not be used for storage of any kind.
- j. All interior and exterior stairwells will be kept clear of all storage, equipment, trash, and flammable liquids.

CHAPTER 5

5-1. Fire Hazards can be found in all facilities. These hazards will cause fires if not corrected. This section will describe various classes of fire hazards and the procedures to eliminate them.

a. Smoking and Disposal of Smoking Materials. The second major cause of fires in the United States is the careless disposal of smoking materials. Guidance on designated smoking areas and no smoking areas can be found in AR 385-55, Prevention of Motor Vehicle Accidents, 1-8, Smoking in DA Occupied Facilities, and local directives. Other requirements are as follows.

(1) Approved metal, self-closing cans will be used to dispose of smoking materials. Approved alternates are cans with sand in them to extinguish smoking material. They will be properly marked "Butts Only".

(2) Smoking materials will be extinguished prior to disposal outside the facility.

(3) Smoking, striking of matches, and using lighters in bed is strictly prohibited.

(4) Facility fire wardens will ensure that designated smoking areas have enough ash trays and cans to control material. They will also police the area regularly.

(5) Smoking, carrying lighters, matches, etc., are forbidden in ammunition and POL storage areas. Vehicle operators carrying fuel, ammunition, explosive material, and hazardous substances will not have any of the above items in the vehicle.

b. Flammable liquids/gases present special hazards and must be controlled and stored properly. This section will describe fire safety measures in accordance with NFPA standards and other Army directives. See reference section for specific references.

(1) Heating, melting of floor wax, or shoe polish is strictly prohibited.

(2) Gasoline will not be used to clean parts, heat buildings as a primary fuel, or used in M-1941 pot-belly stoves.

(3) Dip tanks or parts cleaners will use only high-flash point solvents and will have fusible links in place.

(4) All tanks, hoses and containers used for storage will be kept in continuous metallic contact with approved grounding and bonding devices while being stored, dispensed, or transferred to other containers.

(5) Only approved safety containers will be used for the handling, storage, or use of flammable liquids. They will be marked properly to contents. Quartermaster five gallon (GI) cans are approved for use and will be stored empty, drained and purged, indoors. Once purged, the containers will have caps in place for storage. Plastic jugs, glass containers, or open containers will not be used to store flammable liquids.

(6) Whenever refueling equipment such as generators, heaters, snow blowers, motorcycles or lawn mowers, etc., allow for a 15 minute "cool down" period. Do not store or use this equipment indoors. Whenever storing for the season all residual fuel will be used up or removed.

(7) All flammable liquids, aerosol cans (i.e., paints and solvents) will be stored in indoor inside approved safety cabinets. Latex paint (water-based) does not require special storage except to keep from freezing. All other storage should be kept to a minimum and outside the facility in approved cabinets. Daily working amounts of flammable liquids do not require storage but must be put away at the end of operation.

(8) There is a mandatory notification policy whenever a toxic substance, fuel, hazardous material is discovered, leaking, or spilled anywhere on Fort Devens. The individual who notices this situation will promptly notify the Fire Department by dialing 796-2117. All spills will be cleaned up and disposed of safely in accordance with installation spill control plan and environmental standards.

5-2. Hazardous locations will have special requirements and will be determined in accordance with required NFPA standards and as follows:

a. Flashlights and elective lanterns will be approved by Underwriter's laboratory or Factory Mutual for use in such locations.

b. Special purpose fire extinguishers will be installed in hazardous locations.

c. Open flames are prohibited in areas classified as having hazardous atmospheres.

d. All electrical installations will be in accordance with NFPA 70 and 71 (National Electric Code).

5-3. All electrical, gas or oil fired heating units will be operated and maintained in accordance with manufacturers directions and precautions.

a. A clear space of 10 feet will be maintained of all combustibile and flammable materials if equipment is installed within the facility.

b. Field cooking and heating equipment will be maintained, operated and cleaned in accordance with Army directives. Herman-Nelson heaters will not be used to heat sleeping tents or buildings on Fort Devens. Fuels will not be mixed for usage under any conditions.

c. If you discover a malfunction with installed facility equipment contact the DEH work order desk, 3777/3778.

5-4. Welding, brazing and open flame operations will require a Hot-Work Permit (DA Form 5383-R) before an operation is to take place outside of approved areas for this purpose. All requirements set forth in this regulation and TM-9-237 (Welding Theory and Operations) will be strictly followed.

5-5. Spray painting operations will only be performed in approved areas or outside the facility. All facilities used for this purpose will be protected in accordance with NFPA standards and Army directives.

a. Ventilation systems in spray painting areas will be in operation at all times while performing painting operations.

b. Ventilation filters will be checked for clogging to prevent the accumulation of vapors.

c. Spray painting areas and storage of paint will be inspected regularly for cleanliness and proper storage.

d. Special attention should be placed on operators when using highly flammable/toxic substances such as CARC or nitrocellulose paint.

e. All electrical installations will be in accordance with standard for Class I Group - D locations.

f. Motor vehicles will not move, in or out, of spray booths or areas under their own power. All batteries will be disconnected and removed before painting begins.

g. Smoking is strictly prohibited.

5-7. Explosive material and munitions requirements will be in accordance with TM 9-1300-206 and applicable Army directives. Refer to AR 385-55, Prevention of Motor Vehicle Accidents, whenever transporting these materials.

5-8 Electrical Appliances and Devices.

a. Personnel who reside in unaccompanied billets will not cook inside their rooms. Microwave stations and kitchenettes are the only authorized areas for cooking.

b. The Fort Devens Fire Department does not authorize the use of electrical appliances.

c. Coffee pots, water heaters, curling irons, blow dryers for hair, and irons for clothes must be inspected for use and condition within government facilities (housing occupants exempt).

d. Any person wishing to have an appliance inspected will secure authorization from supervisor and bring authorization form and the appliance to the fire department (building 3500). Once inspected, the item will have an approval label affixed to the appliance with a control number. Items that are damaged or under recall by the Consumer Product Safety Commission will not be approved. Appliances from overseas locations, non-UL, or FM approved items will not be allowed.

e. No connection, installation, or alteration will be made to electrical service in facilities without the approval of the Directorate of Engineering and Housing and meet the National Electric Code requirements.

f. Computers, stereos and other high-powered electrical equipment will use surge protecting devices within the facility.

g. Extension cords will be used only for temporary installations (less than 30 days) and not in place of permanent wiring subject to the following requirements:

(1) They will be of continuous length, no less than 8 feet long, be properly insulated, grounded and in good condition. NO "home-made" extensions.

(2) They will not be knotted, cracked, spliced, taped, stapled or nailed to walls or floors.

(3) They may not run through doors, walls or placed under rugs or carpets.

(4) They will have only one item attached to the cord to prevent the overloading of electrical circuits.

h. Portable heaters should have tilt safety devices and must be kept clear of all combustible materials. The DEH electrical shop should inspect all electrical heaters for safety.

i. Portable light assemblies will not be used without a guard or shield.

j. The use of hot plates or portable stoves (propane) is strictly prohibited.

k. Multiple plug units, "jacks" (3, 6, 9 or more outlets) are prohibited from use unless fitted with its own circuit breaker. Grounding adapters are available for facilities fitted with 2 prong outlets.

l. Electrical circuit breaker boxes and fuse box covers will be kept closed at all times. Circuit breakers will not be bridged or taped in the open position and if malfunctioning must be reported to DEH work order desk (ext 3777/3778) immediately. Fuses will not exceed the rated capacity and will not be altered or replaced by "pennies" or any other items.

5-9. Housekeeping and Proper Storage of Materials and supplies will help prevent many fires. All fire wardens should follow the prescribed storage requirements outlined in DOD 4145.19-R-I. Other requirements are as follows:

a. All waste containers will be non-combustible or metal with covers.

b. Clean rags, dirty oily rags, trash, clean Speedi dri and dirty Speedi dri will be kept separate in individual containers with covers.

c. All trash, waste, debris and smoking materials will be disposed of daily at the close of operation or shift in outside dumpsters located no closer than 15 feet from building.

d. Packing materials will be properly stored and kept separated in individual containers.

e. Classified material will be destroyed and handled in accordance with AR 380-5.

f. All fire aisles, fire exits and fire extinguisher points will be kept clean of all storage.

g. Ceiling clearances in unsprinklered buildings will be 36 inches from stack height of storage on any kind.

i. Storage will maintain a clearance of 18 inches from all lights, beams, heaters, ducts, and vents.

j. Stacks will have a 3 foot clearance where multiple stacks are needed.

k. Storage will not be placed on cages or roof trusses.

l. Storage of compressed gas bottles and containers will be marked, stored upright with safety caps on and chained to walls or cages. Other requirements can be found in AR 700-68.

m. Fire doors will be maintained and operated IAW Life Safety Code requirements for specific facilities. Glass panes will be replaced with wire glass, not be painted and have fusible links as necessary. Curtains will not be placed on fire doors for privacy.

n. Lumber storage areas must be kept well ventilated and free of combustible trash, vegetation, and debris.

o. Salamanders, brazirs and portable heaters or open fires will not be allowed in renovated or partially constructed facilities unless approved by the Installation Fire Marshal.

CHAPTER 6

MISCELLANEOUS

6-1. Military Family Housing occupants must read the Family Housing Manual (Army and local) where fire prevention subjects are covered to prevent fires in family quarters. Additional requirements are as follows:

a. Test smoke detectors and heat detectors monthly.

b. Practice family fire evacuation drills regularly. The Fire Prevention Section can assist in developing evacuation plans.

c. Perform regular fire inspections to eliminate fire hazards from the home.

d. Teach small children the dangers of playing with stoves, matches or lighters.

e. Family housing occupants should notify the fire department of any individual with special disabilities in which assistance is needed for this person to evacuate the quarters.

f. The Fire Prevention Office has many programs to educate housing occupants of fire hazards and will conduct fire safety briefings for housing area groups.

g. Request a courtesy fire inspection of quarters if certain conditions have developed or if questions arise concerning fire safety in the home.

h. If a gas leak is discovered in the home do not turn on any switches, lights or strike lighters or matches. Use neighbor's phone to call DEH work order desk, 796-3777/3778 or the Fire Department, 796-2117.

i. Mobile homes must be in accordance with NFPA and Army standards before placement in trailer park.

j. Avoid lint build-up in clothes dryers by removing lint on a daily basis.

k. Weeds, grass, and vegetation will not be allowed to grow excessively around buildings fuel tanks and/or fire hydrants.

6-2 Dry Weather Periods and Open Fires.

a. Range Control will contact the Fire Department whenever a range/training area fire is discovered.

b. Personnel should try to extinguish fires if possible with available fire extinguishers, otherwise wait for fire department.

c. Impact area fires will not be extinguished unless authorized by the Installation Fire Chief.

d. Range Control will check daily with the Fire Department on the Fire Danger Index and when units request the use of simulators, flares, and special munitions that burn readily.

e. Open fires and burn barrels are not allowed on ranges and training areas.

f. NO Smoking signs will be posted in training areas where necessary.

g. Open burning permits must conform to the Commonwealth of Massachusetts requirements.

h. Barbecue fires will be in authorized pits or located 15 feet away from all structures. Use only approved lighting fluids or briquets. Do not pour lighting fluids on lit fire or use gasoline to light fires. When cooking is done extinguish fire with water.

i. Smoking material, matches or other lit material, will not be thrown from moving vehicles and will be extinguished properly before disposal.

6-3 Firefighting Vehicles, Equipment and Vehicle Control.

a. Firefighting vehicles will utilize all headlights, warning devices, and sirens when responding to emergencies. All other non-emergency vehicles will yield right of way to responding vehicles by pulling to the side of the road until all equipment has passed.

b. Emergency vehicles will not use warning devices during training exercises and will follow all safety rules.

c. Fire hydrants, vehicles, hoses and equipment will not be used for other than firefighting operations or training unless approved by the Installation Fire Marshal and Fire Chief.

d. Privately owned vehicles and other non-emergency vehicles will not be parked within 15 feet of fire hydrants, fire department connections, valves or otherwise block free access of fire equipment to facility entrances. Areas marked as fire lanes will be kept clear and violators will be reported to the Installation Provost Marshal.

e. Vehicles are prohibited from crossing fire hoses at emergencies or exercises. This will prevent water loss and damage to firefighting equipment.

6-4 General.

a. The Installation Fire Chief or his designated representative will attend applicable pre-construction or pre-performance meetings with all concerned activities to brief contractors and concessionaires on fire prevention requirements.

b. Any work requests, alterations, new construction, minor repair or self-help projects will be reviewed and approved by the Installation Fire Chief or his designated representative.

c. Christmas trees and decorations in family housing, barracks, and other facilities will follow local requirement and as follows:

(1) No natural Christmas tree will be permitted in any facility in excess of 15 days.

(2) All Christmas tree ornaments and decorations will be made of non-combustible material.

(3) All light sets will be UL or Factory Mutual approved and in good working order.

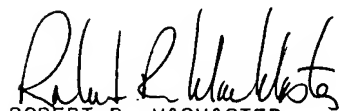
(4) Drill a hole in the bottom of tree, fill with cotton and place in stand with water sugar solution to keep tree moist and prevent the premature drying of the tree. Keep stand filled with water/sugar solution at all times.

d. Sale, storage, possession, or use of fireworks of any description on an Army reservation or property, including Army owned housing areas is prohibited. Rockets, signal flares, and similar pyrotechnic devices which are officially used by the Army will be handled and stored under current directives. Public pyrotechnic displays may be authorized for special occasions by the Installation Commander. Public firework displays must be conducted by an experienced and state licensed private contractor. The fire department will issue permits to conduct these demonstrations.

6-5 References

- a. AR 1-8, Smoking in DA Facilities
- b. AR 5-9, Intraservice Support
- c. AR 385-10, Army Safety Program
- d. AR 385-55, Prevention of Motor Vehicle Accidents
- e. AR 385-64, Ammunition and Explosive Safety
- f. AR 420-70, Buildings and Structures
- g. AR 420-90, Fire Protection
- h. AR 608-10, Child Development Services
- i. DOD 6055.7-M, Fire Incident Reporting Manual
- j. Military Handbook 1008, Fire Protection
- k. National Fire Protection Association Codes
- l. TM 5-695, Maintenance of Fire Protection Systems
- m. Massachusetts General Laws (Fire Prevention and Air Quality)

FOR THE COMMANDER:



ROBERT R. MACMASTER
Director of Information Management

OFFICIAL:
CARROL J. HOWARD
LTC, IN
Deputy Installation Commander

DISTRIBUTION:
A

Personnel Training and Physical Examination Record

Arthur D Little

Site Health and Safety Plan Review Record

I have read the Health and Safety Plan (HASP) for this site and have been briefed on the nature, level, and degree of exposure likely as a result of participation in this project as well as the various procedures and policies which must be followed to minimize potential exposure. I agree to conform to all the requirements of the HASP.

[illegible]

Environmental Monitoring Record

Technician: _____ **Date:** _____

Attachment D

Daily Site Health and Safety Activity Report

Site: Fort Devens, MA	Location:	
ADL Site Personnel:	Subcontractors, Visitors, Others:	
Site Operation(s):	Level of PPE:	
Weather Conditions:		
Onsite Hours (from/to):		
Monitoring Instruments Used (attach Environmental Monitoring Record or record in field log book):		
Site Safety and Health Plan Discrepancies	Corrective Action	
	Specified	Taken (yes/no)
Observations and Comments:		

Completed by: _____ **Date:** _____

Attachment E

**Fort Devens
Examples of Contaminants On-Site**

See Delivery Order Specific Supplement

Attachment F

Accident Report form (DA Form 285)

U.S. ARMY ACCIDENT REPORT Instructions

General. The unit having the accident must investigate it and complete this report. Complete the shaded portions **only** for: Military off-duty, non-fatal accidents; and military on-duty accidents resulting in less than 20 lost workdays, accidents involving 20 or more lost workdays, and/or total property damage of \$2,000 or more will require completion of the entire report. Type or legibly print the report. Items may be continued on a blank sheet of paper and attached to the report. Items listed below are keyed to the block numbers of DA Form 285, May 91. Items not listed here are self explanatory. Specific questions concerning this form should be referred to the local safety office.

SECTION A - Accident Information

Note: This section should be completed for the initial report and for any changes to a previously submitted report.

1. Check "INITIAL" if this is the first report on the accident. Check "CHANGE" if this report is a change to a previously submitted report of the accident.

2. Enter the 6-digit Unit Identification Code (UIC) for the unit responsible for the accident (e.g., WXXXXX).

3. Provide military unit information for the unit listed in Block 2.

a. Full military address (e.g., C Troop, 1/17 Cavalry, Ft. Bragg, NC 12345-6789).

b. Provide the unit branch (e.g., Armor, Infantry, Transportation).

4. Enter the year, month, and day of the accident (e.g., 90 11 07 {7 November 1990}).

5. Enter the military time the accident occurred (e.g., 0815, 2300).

7. Check either item a or b, depending on the location of the accident.

8. If item a is checked, state name of post or installation (e.g., Ft. Bragg, NC; Federal Center, Santa, GA; Ft. Hood, TX; Shaw AFB, SC).

9. Check item a if accident occurred in a theater of hostile fire or enemy action, but not as a result of such fire/action. This includes direct preparation for combat, actual combat, or redeployment from a combat theater.

10. Check "Yes" of explosives (C-4, TNT), ammunition, or pyrotechnics were involved and explain in Block 63 its involvement and specify the National Stock Number (NSN).

11. Give enough detail to find the exact location of the accident (e.g., building number, street or highway name, state and/or country). Also state the type of location (e.g., road intersection, tank trail, family housing, firing range).

SECTION B - Personnel Information

Note: Complete this section for each individual involved and/or injured in the accident. "Involved" means any person who was injured, or who took actions, or made decisions which caused or contributed to the accident. If more than one person was involved, enter information on one person on the initial form and complete only Sections A and B on additional forms for others. Staple all forms together.

16. Enter individual's rank/grade (e.g., E5/SGT, O3/CPT, GS-11, WG-8). Complete for all Government personnel.

17. Enter individual's full MOS/Job Series (e.g., 54E20, 11B40, GS-301).

18. Provide individual's full **Military** address for all Government personnel. If this address is not the same as that in Block 3a, provide the unit UIC.

State how many continuous hours without sleep this individual was on-duty prior to the accident.

22. Indicate how many hours of continuous sleep this individual had in the past 24 hours.

23. State the estimated number of days this individual will be away from work (*totally unable to perform any work, bed rest/on quarters*). Does not include days hospitalized.

24. State the estimated (*or actual*) number of days this individual is hospitalized (*inpatient/admitted*) receiving treatment. Days hospitalized for "observation only" are not reported.

25. State the estimated number of days this individual will not be able to perform his or her regular duties (*light duty, profile*).

26. Check appropriate block. If more than one applies, check the most severe.

28. For this individual's "most severe injury", check the appropriate block(s) (*no more than 3*) that indicate the cause of the injury.

29. **Number** the body part(s) most seriously injured (*no more than 3*) in their order of priority (*the most serious first*). Be as specific as possible.

30. For each body part numbered in block 29, place a corresponding number to indicate the type of injury received (*select only the most serious*).

31. Check the appropriate block that best describes the individual's action at the time of the accident. If Block 31gg is checked, complete Blocks 76 and 77 of Section H, as indicated by these instructions.

32. Provide a short but detailed explanation of the item checked in Block 31.

Note: For this report, the following definitions apply:

Tactical Training - Training in a field environment that uses or develops combat or combat support skills.

Field Exercise and Tactical Training - This begins when the individual reports to his or her primary duty location for movement to the field site and ends when he or she arrives back at the primary duty location from the field.

33. Check "Yes" if activity listed in Block 31 was part of a field exercise. State name of exercise if it has a name (e.g., *Team Spirit, Reforger*).

42. If vision enhancement device(s) were used, specify type and model numbers, and whether they caused the accident (e.g., *Night Vision Goggle, AN-PVS5A*).

43. Provide standard or reference (*Soldier's Manual, AR, TM, etc.*), if it exists, that covers performance of the activity identified in Block 31.

46. Provide a simple explanation of the mistake(s) or how the activity or task was performed incorrectly (e.g., *SGT Smith improperly backed his M915 truck without a ground guide*).

47. **In your opinion**, why was the mistake made or the activity performed incorrectly? Check the most important reason.

51. Check the block corresponding to the piece of equipment associated with the person in Block 12 (e.g., *SGT Adams was driving the "at-fault" HMMWV; his name will be in Block 12, and his vehicle will be item a in Section C below*).

SECTION C - Property/Material Involved

Complete Blocks 52-59 on each piece of property or item of equipment involved in the accident (*whether damaged or not*). Include Army and non-Army, as well as equipment whose use or misuse contributed to the accident. Include up to 3 items of equipment on the initial form. Use additional blank sheets of paper for other equipment if necessary, continuing letter sequence (e.g., A, B, C, D, and E).

52. Type of equipment (e.g., *sedan, truck, generator*).

53. Full military equipment model number or civilian make (e.g., *M109A2, M60A2, Ford Taurus, M16 Rifle*).

55. Estimated cost of damage (ECOD) or actual cost of damage (ACOD) for each piece of property, which includes costs of parts and labor.

57. Indicate if this specific item was being towed **at the time of the accident**.

58. If Block 57 is "yes", indicate which item was doing the towing.

60. Complete for each component or part whose failure or malfunction contributed to the accident. Include the EIR/QDR number in Block 60e.

61. Indicate how and why each component or part failed or malfunctioned by selecting from the lists provided and entering the appropriate number in the blocks provided.

SECTION D - Environmental Conditions Involved

62. Check the environmental conditions present at the time of the accident (*no more than 3*) by checking appropriate blocks, whether contributing to the accident or not. Also check whether they caused or contributed to the accident.

SECTION E - Accident Description/Narrative

63. Fully describe the sequence of events that lead up to and caused the accident. Explain how and why the accident occurred. Also include information required from Blocks 10 and 47.

SECTION F - Corrective Action and Command Review

Note: The level of command review (*Company, Battalion, Division, etc.*) is determined by either the major Army command (MACOM) or installation policy.

65. Fully describe all actions taken, planned, or recommended to eliminate the cause(s) of this accident. Actions should be identified as appropriate at unit level, and all the way up to HQDA level.

SECTION G - SAFETY OFFICE USE ONLY

71. MACOM responsible for this accident (FORSCOM, TRADOC, etc.).

SECTION H - Special Interest/Supplemental Information

This section is for use by the U.S. Army Safety Center, MACOMs, or interested safety offices to obtain additional "Special Interest/Supplemental Information" on this accident as needed (e.g., *M1 tank fires, tactical parachute accidents, etc.*). Blocks 76 and 77 have been designated for collection of supplemental information on parachuting accidents.

Blocks 76 and 77. If Block 31gg was checked, provide the following supplemental information for each individual:

- Name of jumper;
- Jumper height;
- Jumper weight;
- Type of jump (*static line, non-tactical; static line, mass technical; freefall, non-tactical; freefall, tactical*);
- Type of parachute and model;
- Jumper's equipment (*list*);
- Weight of equipment;
- Wind direction and speed at
 - Jump height,
 - Drop zone;
- Jump altitude;
- Jumper's position in stick and door exited;
- Time pre-jump conducted;
- Date of last jump and type of jump;
- Number of previous jumps;
- Date graduated from basic airborne training (*year and month*);
- Type of aircraft;
- Accident cause(s): Improper exit, static line injury, broken static line, parachute malfunction, entanglement, lost or stolen air, oscillation, unstable position, dragged on DZ, tree landing, drop zone hazard (*specify*), or other.

U.S. ARMY ACCIDENT REPORT				FOR USASC USE ONLY		Requirement Control Symbol CSOCS-308	
For use of this form, see AR 385-40, the proponent agency is OCSA							
SECTION A - ACCIDENT INFORMATION							
1. CHECK ONE <input type="checkbox"/> a. INITIAL <input type="checkbox"/> b. CHANGE		2. UIC (Unit Identification Code) (6-Digit Code of Unit Having Accident)		3a. UNIT NAME AND MILITARY ADDRESS		3b. BRANCH (Armor, Infantry, etc.)	
4. DATE OF ACCIDENT a. YR. b. MO. c. DAY		5. TIME OF ACCIDENT (Local Military Time)		6. PERIOD OF DAY (Check one) <input type="checkbox"/> a. Day <input type="checkbox"/> b. Night		7. ACCIDENT OCCURRED (Check one) <input type="checkbox"/> a. On Post <input type="checkbox"/> b. Off Post	
				8. IF ON POST, NAME OF INSTALLATION/FACILITY		9. ACCIDENT OCCURRED DURING (Check one) <input type="checkbox"/> a. Combat <input type="checkbox"/> b. Non-Combat	
10. WERE EXPLOSIVES OR AMMUNITION INVOLVED OR PRESENT? <input type="checkbox"/> Yes (See Instruction Book) <input type="checkbox"/> No		11. EXACT LOCATION OF ACCIDENT (Detailed enough to locate site) (State type of location.)					
SECTION B - PERSONNEL INFORMATION							
12. NAME (Last, First, MI)		13. SOCIAL SECURITY NUMBER (SSN)		14. AGE		15. SEX (Check) <input type="checkbox"/> a. Male <input type="checkbox"/> b. Female	
16. RANK OR GRADE		17. MOS OR JOB SERIES		18. ADDRESS (Use Official Address for All Military or Government Personnel) (If different than block 3, add UIC.)		19. DUTY STATUS AT TIME OF ACCIDENT (Check one) <input type="checkbox"/> a. On Duty <input type="checkbox"/> b. Off Duty	
20. FLIGHT STATUS (Check one) <input type="checkbox"/> a. Yes <input type="checkbox"/> b. No		21. CONTINUOUS DUTY (hrs) (Without sleep)		22. HRS. SLEEP IN LAST 24		23. DAYS LOST (Est. no. of days lost from work; not counting day of injury. Bed rest/on quarters.)	
24. DAYS HOSPITALIZED (Est. no. of days hospitalized receiving treatment; not for observation only.)		25. DAYS OF RESTRICTED WORK ACTIVITY (Est. number of days person cannot perform regular duties; light duty/profile.)		26. SEVERITY OF ILLNESS/INJURY (Check One)		27. CLASSIFICATION AT TIME OF ACCIDENT (Check)	
a. Fatal.		b. Permanent Total Disability. Person can never again do gainful work.		c. Permanent Partial Disability. Person loses or can never again use a body part		d. Days Away from Work. Person misses one or more workdays; bed rest/on quarters.	
e. Restricted Work Activity. Person is temporarily unable to perform regular duties; light duty/profile.		f. First Aid Only. Person has one-time treatment of minor injury. (No lost work days.)		g. No Injury.		28. CAUSE OF INJURY/OCCUPATIONAL ILLNESS (Check the most serious)	
						a. Struck Against	
						b. Struck By	
						c. Fell from Elevation	
						d. Fell from Same Level	
						e. Caught In/ Under/ Between	
						f. Rubbed/abraded	
						g. Bodily Reaction	
						h. Overexertion	
						i. Exposure	
						j. External Contact	
						k. Ingested	
						l. Inhaled	
						29. BODY PART(S) AFFECTED (Check primary) (No more than 3)	
						a. Body (General)	
						b. Head	
						c. Forehead	
						d. Eyes	
						e. Nose	
						f. Jaw	
						g. Neck	
						h. Trunk	
						i. Chest	
						j. Heart	
						k. Back	
						l. Shoulder	
						m. Arm	
						n. Wrist	
						o. Hand	
						p. Fingers	
						q. Leg	
						r. Knee	
						s. Ankle	
						t. Foot	
						u. Toes	
						v. OTHER (Specify)	
						30. TYPE OF INJURY/ILLNESS (Check the most serious)	
						a. Burns (Chemical)	
						b. Burns (Thermal)	
						c. Amputation	
						d. Decompression Sickness	
						e. Asphyxiation (Suffocation)	
						f. Fractures	
						g. Dislocation	
						h. Abrasions	
						i. Concussion	
						j. Sprain/Strain	
						k. Cuts/Lacerations	
						l. Contusion	
						m. Puncture Wound	
						n. Hernia, Rupture	
						o. Frostbite	
						p. Heat Stroke	
						q. Heat Exhaustion	
						r. Noise Injury/Illness	

SECTION B - PERSONNEL INFORMATION (Continued)

31. Person's action(s) at time of accident (Check one and explain in Block 32.)

a. Soldiering	j. Test/Study/Experiments	s. Fabricating	aa. Hobbies
b. Combat Soldiering	k. Educational	t. Handling Material/Passengers	bb. Passenger
c. Physical Training	l. Information and Arts	u. Janitorial/ Housekeeping/ Grounds Keeping	cc. Human movement
d. Weapons Firing	m. Food and Drug Inspection		dd. Horseplay
e. Engineering or Construction	n. Laundry/Dry Cleaning Services	v. Food/Drink Preparations	ee. Bystanding/spectating
f. Communications	o. Pest/Plant Control	w. Supervisory	ff. Personal Hygiene/Food/Drink Consumption/Sleeping
g. Security/Law Enforcement	p. Operating Vehicle or Vessel	x. Office	gg. Parachuting (See Instructions)
h. Fire Fighting	q. Handling Animal	y. Counseling/Advisory	
i. Patient Care (People/Animals)	r. Maintenance/Repair/Serviceing	z. Sports	

32. SPECIFIC DESCRIPTION OF ACTIVITY/TASK

33. ON FIELD EXERCISE (Check one) <input type="checkbox"/> a. Yes (If YES, specify name of exercise.) <input type="checkbox"/> b. No	34. ACTIVITY PART OF TACTICAL TRAINING? (Check one) <input type="checkbox"/> a. Yes <input type="checkbox"/> b. No	35. Type of training facility being used (Check one) a. Garrison b. Local training area c. Major training area d. NTC e. JRTC f. CMTC g. Std. range facility/ live fire h. Other (Specify)
--	--	--

36. Type of training participating in at the time of accident (Check/specify) a. School (Specify) b. Unit → (1) Platoon (2) Crew (3) Individual c. On-the-job training d. Other (Specify)	37. Last time individual received training prior to accident on activity specified in block 31? (Check one) a. 0 - 3 months b. 3 - 6 months c. 6 - 9 months d. 9 - 12 months e. 1 - 2 years f. More than 2 years g. Never h. Not applicable
---	---

38. Required protective equipment CHECK APPROPRIATE BLOCK(S) a. Seat belt b. Helmet c. Goggles/glasses d. Gloves e. Ear plugs f. Other (Specify)	AVAILABLE? YES NO USED? YES NO N/A	39. INDIVIDUAL LICENSED TO OPERATE VEHICLE/EQUIPMENT? (Check one) <input type="checkbox"/> a. Yes <input type="checkbox"/> b. No <input type="checkbox"/> c. N/A
		40. DID ALCOHOL CAUSE/CONTRIBUTE TO THIS ACCIDENT? (Check one) <input type="checkbox"/> a. Yes <input type="checkbox"/> b. No <input type="checkbox"/> c. Unknown
		41. If drugs caused/ contributed to this accident, check appropriate block. a. Prescription b. Illegal c. Over-the-counter d. None
		42. Were vision enhancement devices being used? (Check appropriate block.) a. Yes (Specify type/model in c and d.) b. No c. TYPE d. MODEL

43. Standard/Reference covering activity/task a. Soldier's Manual (Task No.) b. CTT (Task No.) c. AR/TM/FM (Specify) d. SOP e. None (Go to block 45.)	44. WAS ACTIVITY/TASK PERFORMED IAW STANDARD/REFERENCE? (Check one) <input type="checkbox"/> a. Yes <input type="checkbox"/> b. No (If NO, complete blocks 46-47.)
	45. DID INDIVIDUAL MAKE A MISTAKE? (Check one) <input type="checkbox"/> a. Yes (If YES, complete blocks 46-47.) <input type="checkbox"/> b. No

46. What was the mistake? How was the activity/task performed incorrectly? (Explain below.)

47. Why was mistake made/activity performed incorrectly? (Check the most important reason and specify in Block 63.)		
a. Inadequate school training (content/amount)	f. In a hurry	k. Inadequate services
b. Inadequate unit training (content/amount)	g. Poor/bad attitude	l. Improper equipment design
c. Inadequate on-the-job training (content/amount)	h. Lack of rest/sleep	m. Inadequate written procedures (AR, TM, SOP)
d. Fear/ excitement	i. Effects of alcohol/drugs	n. Improper supervision
e. Overconfident in own/others abilities	j. Inadequate facilities	o. Other (Specify in narrative)

SECTION B - PERSONNEL INFORMATION (Continued)

48. Time licensed on this vehicle (Check one)		49. Total AMV driving mileage (Check one)		50. Total time in unit (Check one)	
a.	Less than one year	a.	Less than 1,000 miles	a.	Less than 6 months
b.	One to two years	b.	1,000 - 5,000 miles	b.	6 months - 1 year
c.	Over two years	c.	5,000 - 10,000 miles	c.	Over one year
d.	Unlicensed	d.	Over 10,000 miles		

51. WHICH ITEM FROM SECTION C APPLIES TO THE INDIVIDUAL NAMED IN BLOCK 12? (This is needed in order to relate the person in block 12 to the equipment/vehicle below)

☐ Item A ☐ Item B ☐ Item C ☐ OTHER (Specify)

SECTION C - PROPERTY/MATERIAL INVOLVED (Whether Damaged or Not)

	ITEM A	ITEM B	ITEM C
52. Type of item			
53. Model number			
54. Ownership (DOD, DA, POV, Unit, Person)			
55. Dollar cost of damage			
56. Rollover protection system installed?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> NA	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> NA	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> NA
57. Was this item being towed?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> NA	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> NA	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> NA
58. If towed, enter letter for item doing towing			
59. Types of collision codes (Pick up to three from list below and enter in blocks.) (In sequence.)			

Types of Collisions

- | | |
|---|--|
| 1 - Going forward and collided with moving vehicle | 7 - Ran off the road |
| 2 - Going forward and collided with parked vehicle | 8 - Jackknifed |
| 3 - Collision while backing | 9 - Going forward and rear-ended moving vehicle |
| 4 - Collision with pedestrian | 10 - Going forward and rear-ended parked vehicle |
| 5 - Collision with object (other than vehicle/pedestrian) | 11 - Collision while turning |
| 6 - Overturned | 12 - Other (Specify) |

60. Component/Part that Failed/Malfunctioned (Complete this section if a materiel failure/malfunction caused/contributed to the accident.)

	ITEM A	ITEM B	ITEM C
a. National Stock Number			
b. Part Number			
c. Describe Part			
d. Manufacturer's Identification Code			
e. EIR/QDR Number			
61. How/Why Part Malfunctioned (Select code from "How" list below and enter in first block. select code from "Why" list and enter in second block.)	HOW	WHY	HOW

How Part Failed/Malfunctioned Codes

- | | |
|--------------------------------|-------------------------------|
| 1 - Overheated/burned/melted | 9 - Twisted/torqued |
| 2 - Froze (temperature) | 10 - Compressed/hit/punctured |
| 3 - Obstructed/pinched/clogged | 11 - Bent/warped |
| 4 - Vibrated | 12 - Sheared/cut |
| 5 - Rubbed/worn/frayed | 13 - Decayed/decomposed |
| 6 - Corroded/rusted/pitted | 14 - Electric current action |
| 7 - Overpressured/burst | 15 - Unknown/Other |
| 8 - Pulled/stretched | Blank - Not reported |

Why Part Failed/Malfunctioned Codes

- 1 - Improper equipment design
- 2 - Inadequate maintenance
- 3 - Inadequate manufacture of equipment
- 4 - Inadequate written procedures (AR, TM, SOP)
- 5 - Improper supervision
- 6 - Unknown
- 7 - Other (Specify in narrative)

SECTION D - ENVIRONMENTAL CONDITIONS INVOLVED

62. Environmental conditions. (Check environmental conditions present and indicate if condition caused/contributed to the accident.)

PRESENT	CAUSED/ CONTRIBUTED	CONDITION	PRESENT	CAUSED/ CONTRIBUTED	CONDITION
		a. Clear/dry, visibility unlimited			k. Wind gust/turbulence
		b. Bright, glare			l. Vibrate, shimmy, sway, shake
		c. Dark, dim			m. Radiation, laser, sunlight
		d. Fog, condensation, frost			n. Holes, rocky rough, rutted, uneven
		e. Mist, rain, sleet, hail			o. Inclined/steep
		f. Snow, ice			p. Slippery (not due to precipitation)
		g. Dust, fumes, gasses, smoke, vapors			q. Air pressure (bends, decompression, altitude, hypoxia)
		h. Noise, bang, static			r. Lightning, static electricity, ground
		i. Temperature/humidity (cold, heat)			s. OTHER (Specify)
		j. Storm, hurricane, tornado			

SECTION E - ACCIDENT DESCRIPTION/NARRATIVE (From blocks 10, 47)

63. GIVE THE SEQUENCE OF EVENTS THAT AMPLIFY/EXPLAIN WHAT HAPPENED, LEADING UP TO AND INCLUDING THE ACCIDENT. (Explain why accident happened.)

64a. PRINTED/TYPED NAME OF PERSON COMPLETING THIS REPORT	64b. RANK	64c. TITLE
64d. SIGNATURE	64e. DATE OF SIGNATURE (YY/MM/DD)	64f. TELEPHONE NO.

SECTION F - CORRECTIVE ACTION AND COMMAND REVIEW

65. DESCRIBE THE ACTIONS TAKEN, PLANNED, OR RECOMMENDED TO ELIMINATE THE CAUSE(S) OF THIS ACCIDENT (from unit level up to HQDA).

66a. PRINTED/TYPED NAME OF COMMANDER

66b. RANK

66c. SIGNATURE

66d. DATE OF SIGNATURE
(YY/MM/DD)

66e. TELEPHONE NO.

	a. TYPED NAME	b. SIGNATURE	c. TITLE	d. RANK / DATE
67				
68				
69				

SECTION G - SAFETY OFFICE USE ONLY

70. LOCAL REPORT NO.

71. MACOM

72. Accident type (Check choice)

<input type="checkbox"/> a. Army Motor Vehicle	<input type="checkbox"/> h. Other Army Vehicle	<input type="checkbox"/> o. Personal Injury - Other
<input type="checkbox"/> b. Army Combat Vehicle	<input type="checkbox"/> i. Fire	<input type="checkbox"/> p. Property Damage - Other
<input type="checkbox"/> c. Army Operated Vehicle	<input type="checkbox"/> j. Chemical Agent	<input type="checkbox"/> q. POV - On Official Business
<input type="checkbox"/> d. POV - Not on Official Business	<input type="checkbox"/> k. Explosive	<input type="checkbox"/> r. Space
<input type="checkbox"/> e. Marine Diving	<input type="checkbox"/> l. Missile	<input type="checkbox"/> s. Commercial Carrier/Transportation
<input type="checkbox"/> f. Marine Underway	<input type="checkbox"/> m. Radiation	
<input type="checkbox"/> g. Marine Not Underway	<input type="checkbox"/> n. Nuclear	

73. NAME OF SAFETY POINT OF CONTACT (POC)

74. PHONE NO. OF SAFETY OFFICE POC
(AUTOVON, Commercial, Etc.)

75. DATE REPORT COMPLETED BY
SAFETY OFFICE (YY/MM/DD)

SECTION H - SPECIAL INTEREST AND/OR SUPPLEMENTAL INFORMATION

76.	
77.	
78.	
79.	

Attachment G
Resumes for Key Personnel

Mr. Briggs, a senior consultant in the Occupational Health and Safety Unit, has provided a wide variety of industrial hygiene, safety and environmental consulting services to government and industry in the areas of emergency response, hazardous materials/waste management, and training. At Arthur D. Little, Mr. Briggs' work involves conducting occupational health and safety hazard assessments and other industrial hygiene and safety consulting services such as air monitoring and ventilation surveys. He has conducted numerous health and safety compliance audits for the chemical industry and research laboratories. He is primarily responsible for conducting Arthur D. Little's internal/external hazardous waste operations and emergency response health and safety training. Mr. Briggs is also the designated Health and Safety Officer for Arthur D. Little's USEPA ARCS Region I contract.

For the Canadian Coast Guard, Mr. Briggs assisted in the development and presentation of a customized 40-hour hazardous substances emergency response training program. The course was presented to members of the Canadian Coast Guard and other provincial agencies who have the responsibility to identify, evaluate, contain, control and cleanup hazardous substance releases in the Maritime provinces.

For a major electrical utility located in the Northeast, Mr. Briggs assisted in the development and presentation of three operations-specific, 32-hour emergency response incident commander training courses [per 29 CFR 1910.120 (q)] for designated hazardous substances emergency response team members (e.g., fire department, plant protection, industrial hygienists, environmental management, power plant supervisors, maintenance personnel). For the same company, Mr. Briggs was also involved in the development and presentation of company-specific 8-hour hazardous waste site supervisor and waste site refresher training seminars.

For a manufacturer of submarines, Mr. Briggs developed and presented multiple, customized 8 and 24-hour hazardous materials emergency response training programs for approximately 150 members of the newly-developed hazardous materials response team. The program was designed to present information the requirements of 29 CFR 1910.120 (q) and the State of Connecticut as well as the company's recently revised emergency response plan. The course included classroom sessions, equipment demonstrations, laboratories, hands-on exercises, a table-top response scenario and a full-scale emergency response simulation.

For a large aircraft engines manufacturer, Mr. Briggs designed and provided facility-specific hazardous substance emergency response and hazardous waste training for over 200 personnel who are involved in responding to onsite releases and handling hazardous wastes. The training was designed to meet the requirements of 29 CFR 1910.120.

For a large hospital complex in the mid-west, Mr. Briggs wrote a comprehensive emergency response health and safety plan to assist the client in meeting the requirements set forth in SARA Section 126, SARA Title III and OSHA's Hazardous Waste Operations and Emergency Response Standard. A 24-Hour emergency response

Corey W. Briggs, CIH, CET (continued)

training course was also presented to designated hospital staff with spill response responsibilities.

For Arthur D. Little staff members involved with Superfund and RCRA activities, Mr. Briggs has conducted several comprehensive health and safety training programs (e.g., 40-hour initial and 8-hour refresher) to comply with the requirements established in OSHA 1910.120. The training included classroom instruction, demonstrations, lab and field exercises, and simulated full-scale waste site investigation simulation.

As a sub-consultant to EPA, he was directly involved with the development and presentation of the following hazardous materials/health and safety training programs presented by the USEPA/EERU Training facility in Edison, NJ:

- Hazardous Materials Incident Response Operations
- Sampling of Hazardous Materials
- Incident Mitigation and Treatment Methods
- Hazardous Materials Response for First Responders

As course moderator for the "First Responders" (e.g., Police, Fire, EMS, CD) program, he was largely responsible for the development of the course materials and extensive hands-on activities. He coordinated and presented the initial "road version" for the Waterbury, Connecticut, Fire Department. The spill scenario for this program was specifically designed to involve the participation of all applicable state and local agency personnel. In addition, he was also a team-member on a week long course presented to the New York City Hazardous Materials Team (Hazmat #1) at the Randall's Island training facility.

For a large international corporation, Mr. Briggs is project manager in charge of development and assembly of series of occupational health and safety and environmental management training programs which are to be presented to the corporation's various divisions. The programs are designed to be presented as either "train-the-trainer" courses (Laboratory Safety, Confined Space Entry, Electrical Safe Work Practices, RCRA, etc.) or professional development seminars (Clean Air Act, Clean Water Act, TSCA, SARA). Participant and instructor manuals are being developed along with applicable audiovisual support materials. Arthur D. Little has planned to present each of the training programs to designated division trainers in early 1992.

For a large aircraft parts manufacturer, Mr. Briggs designed and developed a site-specific RCRA personnel operations training program. The course was presented by Mr. Briggs and his team to over 750 employees. The program was designed in a module format so that facility EHS personnel could present the program in the future.

Corey W. Briggs, CIH, CET (continued)

Mr. Briggs previously held several health, safety and environmental positions with International Technology Corporation (IT). As IT's Emergency Response Technical Coordinator for the eastern half of the U.S., he was responsible for auditing response centers, contract administration, technical assistance, and emergency response health, safety and training activities. He was project manager for a million dollar rail transportation escort service for a major chemical manufacturer. Select tasks included presenting hazard specific training to team members and staging accident/evacuation simulation scenarios.

At IT, Mr. Briggs was involved with the development, organization and presentation of emergency response and short-term site remediation health and safety training to USEPA ERCS contractors (Zone IV).

Mr. Briggs had direct involvement with the development and implementation of a comprehensive 40-hour hazardous material emergency response training program for the U.S. Navy. Training included extensive hands-on field activities and complex spill simulations including response to onsite medical emergencies.

Mr. Briggs was the principal health and safety coordinator during the initial emergency response and post-spill remedial activities associated with two major train derailments. These incidents involved initial site characterization investigation, health hazard assessment, feasibility studies, field operations support, project design, onsite training, air monitoring and environmental sampling and a wide range of industrial hygiene and safety activities.

For a large shipbuilder in the midwest, Mr. Briggs wrote a comprehensive emergency response plan and RCRA facility health and safety plan to assist the client in meeting the requirements set forth in SARA, Section 126 and OSHA 1910.120.

For a regional air quality management district in California, Mr. Briggs presented a one-day seminar on personal protective equipment, the OSHA Hazard Communication Standard and personnel decontamination.

While working as a health and safety coordinator and later as a supervisor with IT, Mr. Briggs was responsible for coordinating the health and safety program for IT Field Services and Construction/Engineering in the Southeast and Gulf Coast. Duties included, conducting a wide variety of internal health and safety training, writing site-specific safety and health plans, emergency response, health and safety audits, internal loss control, technical support and industrial hygiene/safety consultation.

Mr. Briggs was the health and safety officer for the USEPA/ORD Mobile Incinerator Dioxin Trial Burn conducted in Southwest Missouri. His responsibilities during this R&D based remedial action included developing and presenting onsite health and safety training, health hazard assessments, personnel and ambient air monitoring, and audits.

Corey W. Briggs, CIH, CET (continued)

He received his B.S. from the University of Rhode Island and his M.S.P.H. in Occupational Health and Safety from the University of South Carolina. He is an ABIH Certified Industrial Hygienist (Comprehensive Practice) and a Certified Environmental Trainer in health and safety, hazardous materials transportation, hazardous waste management and hazard communication by the National Environmental Training Association. Mr. Briggs has lectured at several conferences, meetings and seminars on the various components of emergency response and has presented emergency response training to over 7500 attendees during past educational programs.

Robert N. Lambe

Dr. Lambe is Director and Manager of the Environmental Assessment and Remediation Unit. His 15 years of professional experience include management responsibility for major mineral exploration programs, project experience in mine and mill circuit design, development and interpretation of geochemical and geophysical programs, economic analysis of mining ventures, and environmental assessments of mining, milling, and smelting operations. Prior to joining Arthur D. Little, Inc., Dr. Lambe had been employed by Exxon Mineral Company, and more recently by Newmont Mining Corporation. Examples of previous work include:

- For the Department of Energy, Dr. Lambe has been the senior hydrogeologist on the Arthur D. Little Tiger Team audit contract. His responsibilities have included planning, review of audit plans, review of Arthur D. Little audit reports, and performance of audits. Dr. Lambe was personally involved in the audit of the Idaho National Engineering Laboratory and select phases of Weldon Springs.
- Dr. Lambe assisted in a design safety review of the mine shaft and laterals to be used at the Department of Energy High Level Waste Facility, Yucca Mountain, Nevada. He was responsible for review of both construction and operation of the underground and directly related (ventilation and hoist house) surface facilities using a fault tree analysis approach.
- As part of a corporate divestiture, Dr. Lambe completed an environmental due diligence assessment of the rail and shipping facilities for a taconite producer in Minnesota. Loading, unloading, fueling, and maintenance operations were reviewed. Our assessment focused on hazardous and solid waste management, tank management, air pollution control, water pollution control, asbestos and PCB management. Remedial programs associated with oil and PCB contaminated soils were reviewed and remedial action costs estimated.
- Dr. Lambe managed an environmental assessment of metal fabrication and finishing facilities which examined 19 facilities in five states during a one week period. The assessment involved evaluation of environmental management, air, water and waste management, PCBs, potential soil and ground water contamination, evaluation of off-site disposal practices and CERCLA liabilities and selection of remedial alternatives and costing. During this project, Arthur D. Little worked with an environmental law firm on behalf of the client to structure a limited partnership purchase of the facilities.
- For a major aerospace manufacture, Dr. Lambe performed audits of facilities, focusing on ground water contamination resulting from metal plating, degreasing, and fuel storage operations. This involved examination of operations, reviews of investigations, and determination of liabilities.
- As support for over 70 environmental audits and environmental risk assessments, he has participated in site evaluations and document reviews for several types of industrial facilities including those associated with the power, chemical, aircraft, hazardous waste treatment, mining, milling, and smelting industries. Many of these assessments have involved sampling programs and development of preliminary remedial costs.

Arthur D Little

Robert N. Lambe (continued)

- To assist in a corporate acquisition program, Dr. Lambe worked with and managed subcontractors to design a program to characterize the contamination at four RCRA-permitted hazardous waste treatment, storage, and disposal facilities. The program consisted of interpretation of previous data, additional drilling to obtain water and soil samples, determination of hydraulic parameters, data management, and interpretation of site hydrogeology. The analytical results and hydrogeologic criteria were used for design, sizing, and costing of a system for ground water and soil treatment. The costs developed were used by the client to negotiate the purchase of the facilities.
- Dr. Lambe managed a site investigation of two hazardous waste facilities in Hawaii. The study involved characterization of contamination and preliminary design of remedial systems at two hydrologically complex settings. The geology is a complex interbedding of coral, coral sand, and silt with widely contrasting permeabilities. The sites handle waste oils, solvents, and various sludges. The sampling program involved very rapid mobilization and turnaround and was completed by a four-man team in fifteen days.
- Dr. Lambe managed an Installation Restoration Study (IR) at the U.S. Army Materials Testing Laboratory in Watertown, Massachusetts. The study evaluated potential contamination on this 40 acre site which is in a densely populated area adjacent to the Charles River. Seventeen 4-inch wells were drilled and installed, soil and water samples taken and analyzed, and depth to bedrock estimated using a seismic refraction survey and core holes. Down-hole geophysical logging was utilized to assist in stratigraphic correlation. Hydraulic tests were conducted to determine conductivity, flow rates, and other appropriate properties. Geologic cross sections were constructed and a detailed hydrologic model developed to predict potential contaminant transport.
- Dr. Lambe is presently Deputy Program Manager for the Arthur D. Little ARCS (Superfund) program with EPA Region I. He is also a project manager for the remedial investigation of an NPL site in Rhode Island. The 100-acre site involved illegal dumping of drummed and bulk wastes including: solvents, paint sludges, resins, PCBs, pesticide residues, plasticizers, still bottoms and other hazardous materials. The investigation includes a biota survey, ground water sampling, soil borings and sampling, geophysical surveys, a soil gas survey, geological mapping, and an ambient air quality survey. Other activities include community relations support, ecological and human health risk assessment, feasibility studies, and litigation support.
- Dr. Lambe has prepared and offered, with other Arthur D. Little staff, an 8-hour training course on conducting environmental due diligence assessments.

Robert N. Lambe (continued)

Dr. Lambe received his B.S. degree in geology from the Massachusetts Institute of Technology and M.A. and Ph.D. degrees in geology, specializing in geochemistry, from the University of California at Berkeley. He is a licensed geologist in the State of North Carolina, a registered professional geologist in the State of Tennessee, a member of the Association of Ground Water Scientists and Engineers, the Society of Economic Geologists, the Geological Society of America, the Hazardous Waste Action Coalition, and the National Security Industrial Association. He has published and presented several papers in the fields of geology and geochemistry. He currently holds a Department of Energy Q Clearance.

Peter A. Roy, MPH, CIH

Mr. Roy joined Arthur D. Little after 15 years of experience in academia, consulting, and industry. His professional interests at Arthur D. Little include development and application of engineering controls, health and safety audits and assessments, health, air sampling surveys, ergonomics, industrial noise control, and internal health and safety professional activities. He holds a Bachelor of Science in Biology from Southeastern Massachusetts University, and a Master of Public Health in Industrial Hygiene from the University of Minnesota.

Immediately prior to joining Arthur D. Little, Mr. Roy completed a one and a half year sabbatical as a Visiting Lecturer at Wellington Polytechnic in Wellington, New Zealand. His duties included preparing and presenting lectures on occupational health and industrial ventilation in the National Diploma Program in Environmental Health. He also developed and conducted a series of post-graduate professional training workshops in New Zealand and Australia. Mr. Roy collaborated with governmental regulatory agencies in New Zealand and Australia; and was employed as a consultant by a New Zealand government agency and private industrial firms.

Prior to his sabbatical leave, Mr. Roy served as an Assistant Professor in the Master of Industrial Safety Program at the University of Minnesota-Duluth. The graduate courses he taught included Basic and Advanced Principles of Industrial Hygiene, Air Sampling and Measurement, Basic and Advanced Principles of Industrial Ventilation, Industrial Noise Control, Occupational Ergonomics, Elements of Health Physics and Industrial Toxicology.

In addition, from 1983 to 1989, Mr. Roy served as President of **du Lhut Industrial Hygiene and Safety, Ltd.**, an occupational health and safety consulting partnership specializing in contaminant exposure surveys, industrial ventilation design, Indoor Air Quality (IAQ) investigations, Right to Know training, heat stress analysis and control, noise measurement and control, and expert witness testimony.

Before teaching at UMD, Mr. Roy served as the first Industrial Hygienist for Medtronic, Inc., a Minnesota-based, vertically integrated medical device manufacturer with international operations. He conducted industrial hygiene surveys; designed industrial ventilation systems; produced the first Health and Safety Manual; developed training programs in Laser Safety, Emergency Response, and Chemical Handling; supervised a small staff; and served as Corporate Radiation Safety Officer. He successfully integrated Occupational Health and Safety into research and development, manufacturing processes, and facility modification and construction.

Prior to Medtronic, Mr. Roy was a staff Industrial Hygienist at Industrial Health Engineering Associates, a multi-purpose Industrial Hygiene and Engineering consulting firm.

Mr. Roy is active in a number of professional organizations, including the American Industrial Hygiene Association, the American Conference of Governmental Industrial Hygienists, the American Academy of Industrial Hygiene, and the Semiconductor Safety Association. He is certified in the comprehensive practice of industrial hygiene by the American Board of Industrial Hygiene.

Peter A. Roy, MPH, CIH (continued)

- Mr. Roy has worked as a consultant to many clients. These include governmental agencies, educational institutions, hospitals, laboratories, law firms, electric utilities, and small and large scale industrial manufacturing facilities. He has conducted Industrial Hygiene surveys for a broad range of airborne contaminants. He has provided recommendations for corrective action. Often these findings led to further involvement with clients in the design or re-design of industrial ventilation systems, work practice revisions, material selection, and personal protection.
- Mr. Roy is an experienced and credible expert witness. He has provided important analyses, findings, reports, demonstrations, affidavits, and expert testimony. His testimony has included regulatory hearings, workers' compensation hearings, and a variety of civil cases involving issues of occupational health and safety, industrial toxicology, product liability, and toxic torts.
- Mr. Roy is a recognized international expert in the health and safety of the use of ethylene oxide (EtO) as a sterilizing/fumigation agent. He has worked as a consultant to governmental agencies, hospitals, medical device manufacturers, and industrial and contract sterilization facilities. Mr. Roy has conducted facility health and safety assessments, including air monitoring studies. He has developed and applied ventilation designs and other engineering methods to control the health and safety hazards associated with EtO sterilization. Mr. Roy has conducted many local and national training programs and seminars on EtO Health and Safety. Additionally, Mr. Roy has provided significant expert witness testimony on the subject of EtO health and safety.
- For the Solicitor's Office of US-DOL OSHA, Mr. Roy provided analysis and expert witness testimony for the 1983 regulatory hearings on revision of the OSHA Permissible Exposure Limit (PEL) on ethylene oxide. His contribution was proving the feasibility of engineering controls to achieve adequate exposure reduction to achieve the new PEL.
- Mr. Roy collaborated with the Australian National Occupational Health and Safety Commission ("Worksafe Australia"), Sydney NSW, Australia. He contributed to and reviewed the Australian *Draft National Code of Practice and Guidance Note for the Safe Use of Ethylene Oxide in Sterilization/Fumigation Processes* for Worksafe Australia. Additionally, Mr. Roy served as a referee for Worksafe Australia's Occupational Health and Safety Research Grant Program.
- As a consultant to a major South Pacific-area Aluminum Smelter, Mr. Roy assessed the design and performance of large scale ventilation systems for the control of airborne contaminants and heat stress. The project involved several different buildings throughout the carbon cathode production process in one of the world's largest such facilities. Mr. Roy provided recommendations and concept designs for dilution and local exhaust ventilation systems to correct several long-standing problems. He also conducted several basic and advanced Industrial Ventilation training programs to smelter engineering staff.

Peter A. Roy, MPH, CIH (continued)

- Also while in Australia, Mr. Roy provided health and safety guidance to a major hospital Sydney-area and a contract sterilizing firm about the use of ethylene oxide as a sterilant. He also provided guidance for improved local exhaust and dilution ventilation for ship repair and maintenance operations at the Royal Australian Navy Yard, Sydney NSW, Australia.
- While in New Zealand as a visiting Lecturer in 1989-1990, Mr. Roy collaborated with the senior professional staff of the New Zealand Department of Labour, Division of Occupational Safety and Health (OSH), in Wellington, New Zealand. He reviewed proposed National Health and Safety Regulations and Work Practice documents for the New Zealand Labour Department, and aided in the training of OSH Factory Inspectors.
- As a consultant to the New Zealand Department of Social Welfare, a governmental agency, Mr. Roy assessed and recommended corrective actions to control ventilation-related "Sick Building Syndrome" problems in office buildings. Mr. Roy also identified the causes for several occupational ergonomic problems plaguing clerical and computer terminal workers. He provided comprehensive recommendations aimed at reducing the occurrence of Repetitive Trauma Injuries in these workers.
- Mr. Roy developed an advanced professional seminar in Industrial Ventilation. He conducted the first-ever series of these programs in New Zealand and Australia. Attendees included Occupational Hygienists, Factory Inspectors, Health Protection Officers, Environmental Health Officers, engineers, tertiary educators, and ventilation contractors.
- For a Fortune 100 company, Mr. Roy served as a member of an Arthur D. Little assessment team tasked with a company-wide review of health, safety, and environmental policies and practices. Mr. Roy assessed the structure and function of the Occupational Health and Safety organization, and provided recommendations for improved performance and service to corporate and divisional needs.
- For the Arthur D. Little - US Department of Energy "Tiger Team" Environmental Auditing Project, Mr. Roy authored the Project Health and Safety Plan, served as project Health and Safety Officer, and aided in Tiger Team training programs.
- As a consultant to a large regional medical center in the Midwest, Mr. Roy headed an air monitoring study for airborne waste anesthetic agents. Study areas included: operating rooms, delivery rooms, recovery rooms, and associated spaces. The study was conducted because of extensive facility reconstruction, purchase of new anesthesia equipment, and concerns about potential hospital employee health hazards. The study uncovered several problems with gas scavenging equipment, anesthesia equipment leaks, and insufficient building ventilation. The report provided information for correction of existing problems and guidance for establishing a departmental health and safety and routine air monitoring program.

Peter A. Roy, MPH, CIH (continued)

- As a consultant to a large Midwest USA Utilities company, Mr. Roy supervised a team that studied a complex problem of inter-related hazards in a large central fleet maintenance garage. The project included the issues of over-exposures to a variable mixture of airborne agents, and poorly designed and malfunctioning HVAC and Local Exhaust Ventilation (LEV) systems. Because of the long standing nature of these problems, poor management-employee relations further complicated the issues. The final project report quantified exposures, identified ventilation deficiencies, and provided a series of specific designs and recommendations for corrective actions. Once implemented these actions controlled the health problems, and in turn, this helped to rebuild worker morale.
- As a consultant to a Midwest Public Utilities Cooperative, Mr. Roy headed a team that investigated a long-standing indoor air contamination problem in the administrative offices and maintenance garage. The study identified significant problems with the building ventilation systems and work practices. The report provided recommendations for correction of the underlying problems. It included designs and specifications for modifications to the HVAC system and installation of local exhaust systems in the maintenance areas.
- As a consultant to a Regional High School in Minnesota, Mr. Roy headed a team studying Indoor Air Quality problems in classroom, laboratory, and shop areas. The study uncovered problems in poor design and function of building HVAC and exhaust systems, and re-entrainment of exhaust air into building air intakes. Besides identifying the issues, the report included recommendations and designs for correction of the ventilation problems.
- As a consultant to a private University in New York, Mr. Roy conducted a study in an Administration Building whose occupants had long-standing Indoor Air Quality complaints. The study identified problems with the building HVAC system and with ergonomic issues of work station design. The report included suggestions on correction of work practices and specified needed HVAC system modifications.
- As a consultant to a major North American paper company, Mr. Roy has conducted various occupational safety and health investigations. He also completed two specialized studies of heat stress exposure in paper-making and maintenance operations, and recommended corrective actions to reduce heat stress hazards.
- Mr. Roy worked as a consultant for the major United States paper machine manufacturer. He provided designs and prototyped several types of novel local exhaust hoods and ventilation systems to control problems of release of acid gases from large and small scale roller machining and etching operations.
- As a consultant to the major North American manufacturer of railroad maintenance equipment, Mr. Roy completed a study of noise and dust exposures to the crews of self-propelled rail grinding machines. The work also entailed the specifications of engineering methods, work practices, and personal protective equipment to control over-exposures.

Peter A. Roy, MPH, CIH (continued)

- For a major North American petroleum pipeline company, Mr. Roy supervised an investigation team for an in-depth study of benzene exposures in petroleum pipeline operations. The study included transport of both crude oil and liquified natural gas. In addition to quantifying airborne benzene exposures, the report recommended the redesign of ventilation systems in the enclosed pumping stations for improved control of fugitive emissions.
- For a Midwest USA Petroleum Refinery, Mr. Roy conducted field studies assessing exposure of refinery workers to airborne benzene.
- As a consultant to another Midwest USA Petroleum Refinery, Mr. Roy assessed the HVAC and local exhaust ventilation systems of the refinery laboratory. He provided designs and specifications for improvements to the laboratory ventilation system for improved health, safety, and comfort in the entire laboratory complex.
- For a major United States grain handling company, Mr. Roy developed and presented training programs on grain fumigant health and safety.

**Environmental,
Health, and
Safety
Directorate
Chemical
Hygiene Plan for
Field Operations**

Report

January 1994

Arthur D. Little, Inc.
Acorn Park
Cambridge, Massachusetts
02140-2390

Reference 92331

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Attachment 1

Modified EPA 418.1 (Total Petroleum Hydrocarbons)
EPA 601 (Volatile Halogenated Compounds)
EPA 602 (Aromatics)
Modified EPA 608 (Pesticides/PCBs)

1.0 Introduction (General Principles)

1.1 Policy

This Chemical Hygiene Plan (CHP) has been prepared in accordance with the requirements of OSHA's laboratory standard, 29 CFR 1910.1450, "Occupational Exposures to Hazardous Chemicals in Laboratories." Arthur D. Little, Inc. (ADL) and the Environmental Health and Safety (EHS) directorate within Arthur D. Little, are firmly committed to ensuring that the procedures, safety and containment equipment, personal protective equipment, and work practices outlined herein are capable of protecting employees from the health hazards presented by hazardous chemicals.

1.2 Coverage

The policies set forth in this Chemical Hygiene Plan are applicable to all laboratory employees. Laboratory health and safety policies, however, cover only duties and tasks performed by EHS laboratory personnel while physically situated in temporary analytical laboratories located at field operations and client facilities. This could include, but is not limited to, work at government and commercial hazardous waste site operations (e.g., RI/FS) and activities at traditional client locations.

1.3 Availability

This Chemical Hygiene Plan is available to all EHS laboratory employees located at field laboratories. Copies may be obtained from laboratory management and/or the EHS Chemical Hygiene Committee (CHC).

1.4 Organization, Roles and Responsibilities

The authority and responsibility for implementation of the chemical hygiene policies at the operating level are delegated by corporate management to laboratory management. To fully implement chemical hygiene policies, the assistance and cooperation of all laboratory employees is essential. The following descriptions outline key roles and responsibilities of laboratory employees at all levels.

1.4.1 Managing Directors

Each managing director is ultimately responsible for ensuring that each laboratory group within his/her section has developed, implemented, and communicated an acceptable CHP to all applicable section staff. He or she will ensure that the CHP is reviewed annually and is readily accessible to all employees. The section manager will ensure that all staff, including unit managers and case leaders, follow the CHP.

1.4.2 Case/Project/Unit Managers

Laboratory management is responsible for the safety and chemical hygiene of the laboratory and its workers. It will be the case/project/unit manager's responsibility to see

that the field laboratory operations are in compliance with this Chemical Hygiene Plan. Laboratory management is also required to:

- Ensure that laboratory staff on the project know and follow chemical hygiene policies and practices;
- Develop any additional procedures needed for specific laboratory areas or laboratory operations;
- Ensure that all field laboratory staff receive all appropriate training (reference section 2.2 of this plan) and that training activities have been properly documented;
- Ensure that any project involving the use of hazardous materials, or other safety or health hazards, receives appropriate Chemical Hygiene Committee (CHC) or environmental, health, and safety review, when applicable;
- Identify and notify the Medical Center and Chemical Hygiene Committee of the staff members who should be included in the medical surveillance program;
- Ensure that the cost of safety equipment and reviews is considered in proposal pricing;
- Ensure that control measures selected for use of any material in the laboratory are adequate;
- Ensure that personal protective equipment (PPE) is available and working properly;
- Perform or designate a(n) individual(s) to perform regular chemical hygiene and housekeeping inspections, including inspections of emergency equipment;
- Follow the recommendations of the CHC and correct any unsafe laboratory conditions;
- Establish, in conjunction with the Chemical Hygiene Committee, adequate record keeping systems for maintenance of exposure monitoring and medical consultations/evaluations records on each employee, in accordance with requirements of 29 CFR 1910.20 (Access to Employee Exposure and Medical Records).

Although the unit manager may delegate one or more of these requirements to a qualified individual, the unit manager is ultimately responsible.

1.4.3 Study Directors, Case Managers, and Principal Investigators

Each study director has a responsibility to anticipate and adequately plan for handling all hazards within casework.

1. Prior to beginning case work, the case leader will review chemical-specific health and safety information and prepare a chemical use case plan and hazard characterization worksheet(s), Figures 1 and 2, and submit the forms to the

CHC for review. A Hazard Characterization Worksheet (Figure 2) should be completed for each neat material, and any "new" chemicals. Chemicals may be grouped into classes, if applicable, as determined by the case manager (i.e. standard solutions of PAH's).

2. Prior to beginning any laboratory work, (i.e. at a "kick-off meeting"), the case leader will inform all case members of:
 - The chemicals that will be used and their associated physical and health hazards;
 - Proper handling and disposal methods for any chemicals used for the case;
 - The proper personal protective equipment (PPE) to use;
 - Methods and observations to be used to detect the presence or release of a hazardous chemical in the area;
 - Proper response in case of an accident, spill, or injury.

Case Information

Date of Submission: _____

Submitted by: _____ Location: _____ Extension: _____

Case #: _____ Client name: _____

Location of work: _____

Start date: _____

End date: _____

Type of case work/proposed use: _____

Case members: _____

Substances and amounts to be used: _____

Figure 1 Chemical Use Case Plan

Substance Information

Brand Name or Chemical Name: _____

Date to be Received: _____ Supplier/Manufacturer: _____

MSDS Requested (Y/N): _____ MSDS Received (Y/N): _____

Do not proceed with review unless an MSDS or other adequate information is available.

1. Characteristics of this substance (circle all that apply):

gas	acid	corrosive	flammable	mutagen
liquid	base	acutely toxic	combustible	
solid	poisonous	carcinogenic	pyrophoric	
infectious	LD ₅₀	oxidizer	explosive	
radioactive	peroxide	teratogenic	volatile	

Other:

Incompatible with/ sensitive to:

heat	shock	cold
light	pressure	water

2. Is any component of the mixture present at levels greater than 1% (0.1% for carcinogens), classified as any of the following chemical hazards:

	YES	NO
Toxic	_____	_____
Corrosive	_____	_____
Carcinogen	_____	_____
Systemic toxin (e.g. of the lung, kidney, liver, etc.)	_____	_____

3. List PPE required when using this substance.

Figure 2 Hazard Characterization Worksheet

4. Is any special training needed to use this substance? (If yes, please list)

5. Procedure for Disposal:

As the responsible investigator, I will inform all personnel working with this chemical of the potential hazards involved. I have read the safety policy for handling hazardous chemicals in the safety implementation plan, and agree to follow all applicable recommendations:

_____	_____	_____
Signature	Title	Date

Approved by Chemical Hazards Committee:

Signature of Member CHC: _____ Date: _____

Signature of Member CHC: _____ Date: _____

Figure 2 Hazard Characterization Worksheet (Continued)

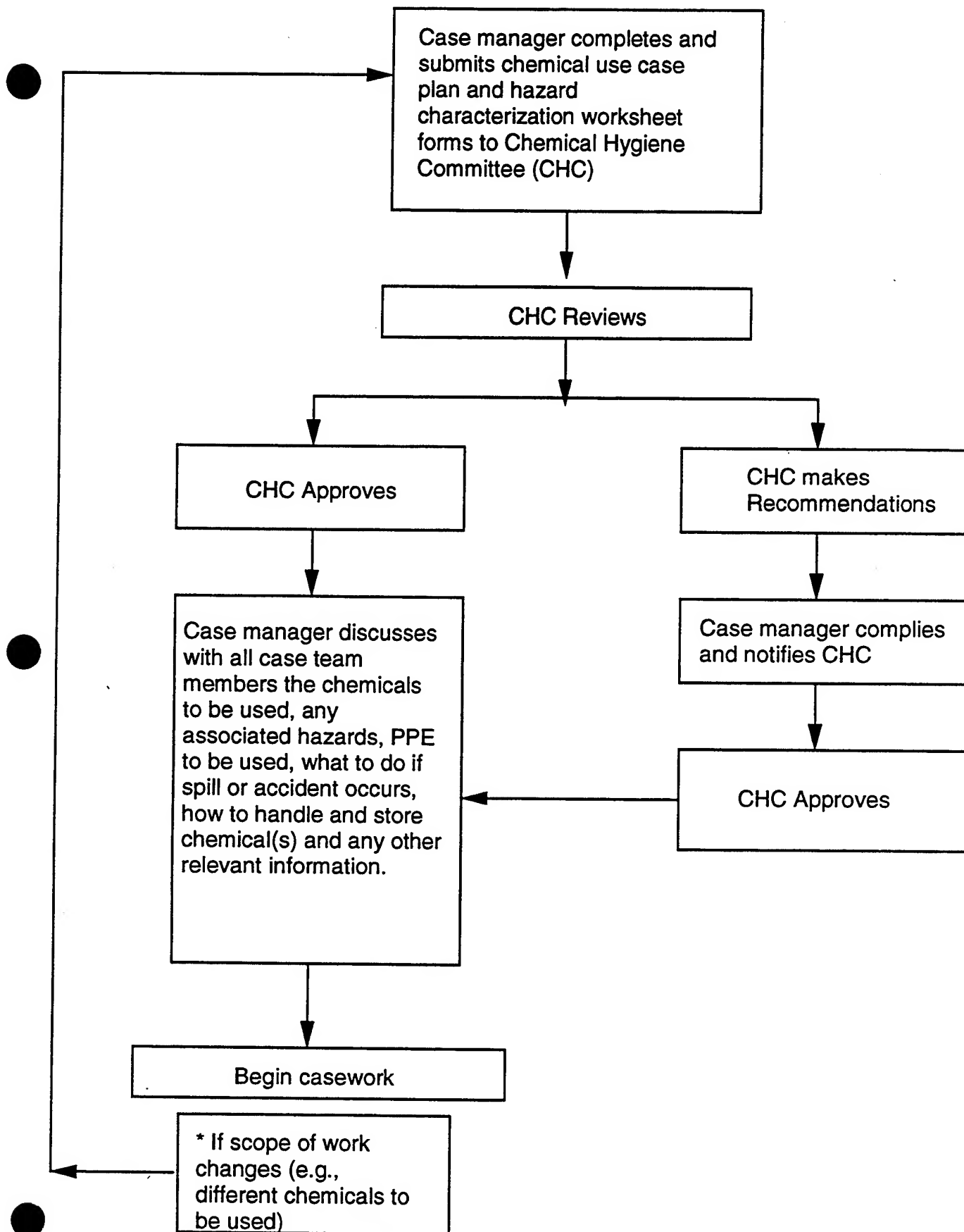


Figure 3 Case Management Requirements

3. During the casework the case leader will:

- Ensure that workers know and follow chemical hygiene policies and practices, and that workers have been properly trained;
- Ensure that control measures selected for use with any material in the laboratory are adequate;
- Ensure that personal protective equipment is available and working properly;
- Follow recommendations of the CHC and correct any unsafe laboratory conditions.
- If scope of case work changes (i.e. new chemicals used) notify the CHC in writing.

1.4.4 Chemical Hygiene Committee

The Chemical Hygiene Committee (CHC) is comprised of EHS staff members (reference Figure 4). This committee is charged with the following responsibilities:

- Setting criteria for evaluating potential exposures, including description of circumstances requiring prior approval for use of hazardous chemicals/operations;
- Establishing an industrial hygiene monitoring and evaluation program;
- Selecting and setting the guidelines for use of engineering controls, protective equipment, and special hygiene practices;
- Reviewing, making recommendations, and approving the use of chemicals for specific case plans;
- Making provisions for additional employee protection for work with particularly hazardous substances;
- Overseeing the procurement, use, and disposal of chemicals;
- Reviewing and evaluating the effectiveness of the Chemical Hygiene Plan annually;
- Establishing, developing, and reviewing laboratory health and safety training programs;
- Communicating its policies and activities to laboratory personnel and to other personnel affected by such policies.

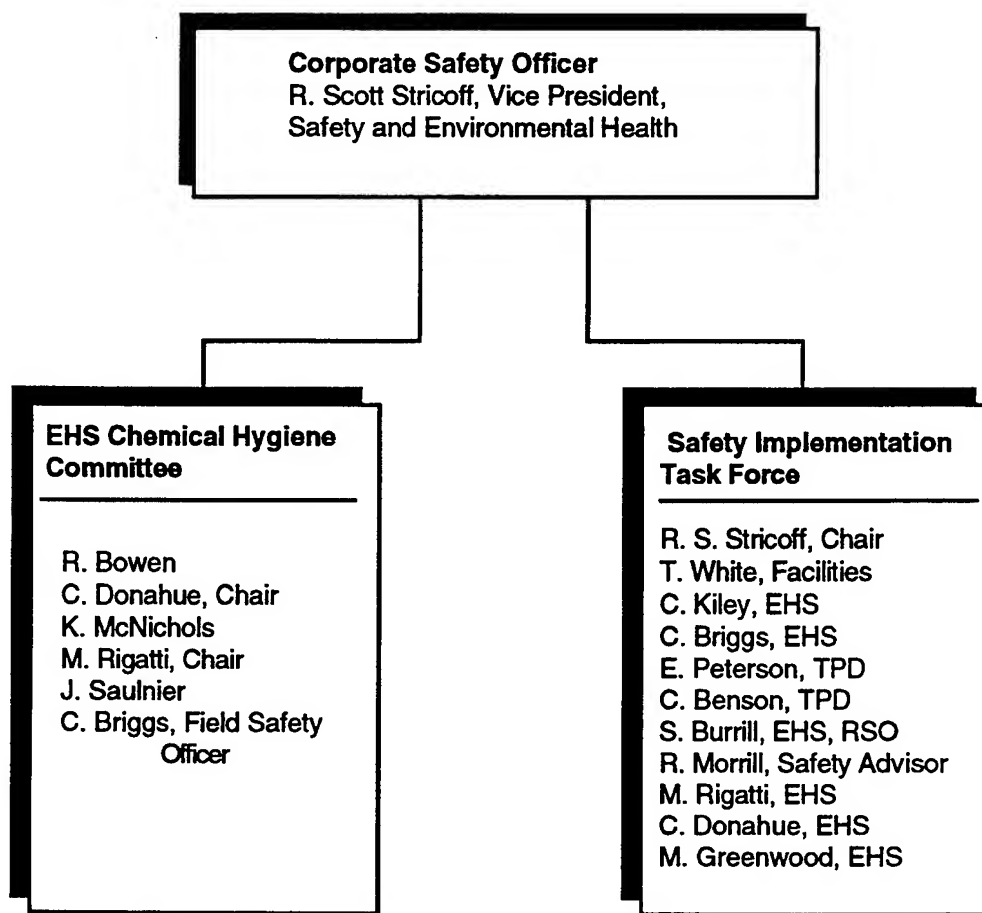


Figure 4 Safety Policy Committees

1.4.5 Chemical Hygiene Officer (CHO)

The Chemical Hygiene Officer(s) is the chairperson(s) of the Chemical Hygiene Committee and is responsible for providing technical guidance in the development and implementation of the provisions of the Chemical Hygiene Plan, and for the day-to-day implementation of the Chemical Hygiene Plan. In this capacity, the Chemical Hygiene Chair Person(s) works with management and other employees to develop and implement appropriate chemical hygiene policies and practices. He/she also helps laboratory management develop precautions and secure adequate facilities for implementation of the Chemical Hygiene Plan, and through interaction with laboratory management and staff, continually seeks to improve the chemical hygiene program. The Chemical Hygiene Chair also has the authority to delegate health and safety duties to the CHC and/or employee staff.

The Chemical Hygiene Chairperson is also required to:

- Oversee the procurement, use, and disposal of chemicals used in conjunction with the CHC;
- Coordinate the inspection of the laboratory to ensure compliance with the provisions of the Chemical Hygiene Plan;
- Coordinate monitoring of health and safety conditions at laboratory facilities and investigate accidents/exposures;
- Notify upper management of unsafe conditions when appropriate;
- Arrange for industrial hygiene monitoring as appropriate and inform employees of results;
- Establish, in conjunction with the laboratory management and the ADL Health and Safety Policy Committee, adequate record keeping systems for maintenance of exposure monitoring and medical consultations/evaluations records on each employee, in accordance with requirements of 29 CFR 1910.20 "Access to Employee Exposure and Medical Records";
- Ensure that corrective action is taken to prevent the exposure to and/or release of hazardous chemicals;
- Consult with the CHC and laboratory management on matters pertaining to information and training; coordinate maintenance of training records;
- Review the Chemical Hygiene Plan annually, and update as necessary;
- Remain abreast of regulatory and legal requirements associated with the use of hazardous chemicals.

1.4.6 Field Laboratory Employees

Field laboratory employees are expected to read, understand, and observe all chemical hygiene policies and practices listed herein, and to use professional judgement when making decisions regarding the safe conduct of work. Laboratory employees are also required to:

- Plan and conduct laboratory operations in accordance with EHS chemical hygiene procedures;
- Wear the personal protective equipment (PPE) required for each task to which he/she is assigned;
- Use the engineering controls and safety equipment required for each task to which he/she is assigned;
- Develop good personal chemical hygiene habits;
- Participate in all required training programs, including chemical hygiene training;
- Report to laboratory management and the chemical hygiene officer all facts pertaining to accidents resulting in exposure to hazardous chemicals, and any action or condition that may cause an accident and/or exposure to hazardous chemicals;
- Assist with the medical consultation/examination process by providing all required information to the examining physician.

1.4.7 Corporate Safety and Health Advisor

- Responsible for coordinating the Arthur D. Little hazardous waste management program;
- Available to provide technical support to field operations.

1.4.8 Field Safety Officer

- Responsible for coordinating safety and health activities for field operations;
- Approves and/or assembles site-specific health and safety plans;
- Provides onsite/offsite health and safety technical assistance to field operations;
- Conducts or coordinates periodic health and safety site reviews to determine compliance with established requirements.

1.4.9 Visitors

You are responsible for any visitor you bring into Arthur D. Little, Inc. and must ensure that he/she:

- Signs in with the receptionist;

- Wears a visitor's badge at all times while on the premise, and surrenders it upon leaving;
- Wears all required personal protection equipment while in a laboratory;
- Knows the evacuation and emergency procedures;
- Is escorted at all times.

When an individual, such as a service contractor or service engineer, will be working on the premise for an extended period of time, and does not require constant escorting, he/she may be assigned a contractor's badge. Contact facilities operation center (extension 6620) for more information.

2.0 Management Systems Policies

Management systems are a collection of organizational structures, procedures, activities, and engineering controls employed by a facility to help direct and regulate its compliance activities.

This section of the Chemical Hygiene Plan describes administrative policies pertaining to Mobile Field Laboratory Management Systems within the Environmental, Health and Safety practice of Arthur D. Little, Inc.

2.1 Hazard Identification, Characterization, and Control

Control measures to reduce employee exposure to hazardous chemicals can be determined and implemented by applying criteria necessary to identify and characterize the nature of chemical hazards in the field laboratories. At field locations, hazard identification shall be performed at all levels through methods and observations used to detect the presence or release of hazardous chemicals, and by observance of safety vigilance. In addition, EHS field laboratories shall keep up-to-date chemical inventories and collections of Material Safety and Data Sheets (MSDSs) for purposes of hazard identification and communication (see Section 4.0). Hazard characterization and control shall be achieved primarily through the activities of the Chemical Hygiene Committee, Chemical Hygiene Chairperson, Field Safety Officer and laboratory management. The goal of all hazard identification, characterization, and control efforts is to ensure that all laboratory employees' exposures to OSHA regulated substances do not exceed the permissible exposure limits (PELS) specified in 29 CFR part 1910, subpart Z.

2.1.1 Chemical Hygiene Review

The EHS Chemical Hygiene Committee will regularly perform hazard characterization and control selection for all "new" (not included in current inventories) chemicals procured and whenever new chemical procedures (tests) are introduced. The lead chemist is required to complete the forms in Figures 1 and 2 for each new study, and when either the chemicals being used or the location of work changes.

The Chemical Hygiene Committee will review each chemical use case plan and determine if the engineering controls and personal protective equipment (PPE) the case leader has suggested are adequate to protect the laboratory workers. The CHC will return its decision to the case leader with recommendations and/or requirements. Approval of two members of the CHC is required before case work begins.

Whenever tasks involve work with hazardous substances, including select carcinogens, reproductive toxins and/or substances with acute toxicity, specific consideration shall be given to provisions for additional employee protection. The following provisions shall be considered as appropriate during the Chemical Hygiene Committee review process:

- Specification of designated area(s);
- Use of containment equipment such as fume hoods;
- Procedures for safe removal of contaminated waste;
- Decontamination procedures.

Selection of suitable control options for additional employee protection shall be based on the professional and technical judgement and discretion of the Chemical Hygiene Committee, whose decisions shall become chemical hygiene policy.

2.1.2 Employee Exposure Determination

The Chemical Hygiene Committee may also use industrial hygiene monitoring techniques to make an employee exposure determination and subsequently institute control measures. If the Chemical Hygiene Committee receives information from laboratory employees, management, or other reliable sources that constitutes a "reason to believe" (29 CFR 1910.1450 (d)(1)) that exposure to any substance regulated by a standard which requires monitoring routinely exceeds the Action Level, or the PEL, the CHC will contact an Industrial Hygienist from the OHS unit to measure the employee's exposure. The CHC shall determine, on a case-by-case basis, the level of evidence to constitute a "reason to believe" that exposures routinely exceed permissible levels.

If initial monitoring conducted under this scenario discloses that an employee is over the Action Level (or in the absence of an Action Level, the PEL), the appropriate unit shall immediately comply with the exposure monitoring provisions of the relevant standard, and may terminate monitoring in accordance with the relevant standard. Within 15 working days after the receipt of any monitoring results, the appropriate unit shall notify the employee and the CHC of these results in writing. For each employee, the appropriate unit shall establish and maintain an accurate record of any measurements taken to monitor employee exposures. These records shall be kept, transferred, and made available in accordance with 29 CFR 1910.20, "Access to Employee Exposure and Medical Records."

2.2 Employee Information and Training

In accordance with the requirements specified in 29 CFR 1910.1450, EHS laboratory employees will receive the information and training needed to ensure that they are apprised of the hazards of chemicals present in their work areas. The goal of the EHS information and training program is to ensure that all individuals at risk are adequately informed about the work in laboratory facilities, its risks, and appropriate response in case of emergency. Information provided to EHS employees shall include, but not be limited to, the following:

- Safe laboratory procedures;
- Portable fire extinguisher training;
- Red Cross First Aid and CPR (strongly recommended, but not mandatory);
- Bloodborne pathogens (mandatory if rendering first aid/CPR);
- Respirator use, if applicable;
- Emergency response and evacuation;

- Handling hazardous chemicals;
- Hazardous material transportation requirements;
- Accident spill and response;
- Use of MSDS's;
- Disposal of hazardous chemicals;
- Encumbering or using of radioactive materials, if applicable;
- Encumbering or using of biohazards, if applicable;
- Hearing conservation program (where applicable);
- Contents of 29 CFR 1910.1450 and its appendices;
- Location and availability of the EHS Chemical Hygiene Plan for Field Operations;
- Permissible exposure limits for OSHA regulated substances or recommended exposure limits for other hazardous chemicals used in the laboratory where there is no applicable OSHA standard;
- Signs and symptoms associated with exposures to hazardous chemicals used in the laboratory as found in MSDS;
- Location and availability of reference material, such as MSDSs, pertaining to the hazards, safe handling, storage and disposal of hazardous chemicals used in the laboratory;
- Hazardous waste management per RCRA and state requirements.

Information and training shall be provided to employees at the time of initial assignment to the laboratory work area, and prior to assignments/tasks involving new exposure situations. Refresher training will be provided yearly.

Initial chemical hygiene training for new employees shall be provided by the employee's immediate laboratory management. Training in chemical hygiene at EHS shall include:

- Methods and observations that may be used to detect the presence or release of a hazardous chemical (such as visual appearance or odor of hazardous chemicals when being released, continuous monitoring devices, monitoring conducted by the employer);
- The physical and health hazards of chemicals in the work area;

- The measures employees can take to protect themselves from chemical-associated hazards;
- Applicable details of the ADL and EHS Chemical Hygiene Plans.

If laboratory personnel are to be involved in field sampling activities the hazardous waste operations training provisions of 29 CFR 1910.120(e) must be met (e.g. 24-hour or 40-hour training based upon site activities).

Laboratory management will ensure that training records are maintained and accurate.

2.3 Medical Consultation and Medical Examinations

All laboratory employees working with hazardous chemicals shall have access to medical attention, including initial and periodic medical exams, and any follow-up examinations the examining physician determines to be necessary without cost to the employee or loss of pay. An employee may refuse an exam if he/she signs a release. All medical examinations and consultations will be provided at a reasonable time and place through the ADL Medical Center, staffed by Mount Auburn Hospital occupational nurse practitioners and doctors. Medical examinations shall be provided to ADL employees under the following circumstances:

- Before an employee begins laboratory work and yearly thereafter while performing laboratory work;
- Whenever an employee develops signs or symptoms associated with possible exposure to a hazardous chemical handled in the laboratory;
- Where exposure monitoring reveals an exposure level routinely above the Action Level (or in the absence of an Action Level, the PEL) for an OSHA regulated substance for which there are exposure monitoring and medical surveillance requirements; other medical surveillance requirements shall also be observed;
- Following a medical consultation during which the physician determines the need for a medical examination, in response to an event such as a spill, leak, or an explosion, or other occurrence causing the likely exposure.

For all medical consultations and examinations, the laboratory supervisor shall provide the following information to the physician:

- The identity of the hazardous chemical(s) to which the employee may have been exposed;
- A description of the conditions under which the exposure occurred including quantitative exposure data, if available;

- A description of the signs and symptoms of exposure the employee experiences, if any;
- Chemical identity and hazard information must be provided, regardless of any client confidentiality agreements.

For all medical consultations and examinations performed in accordance with the OSHA laboratory standard, the examining physician shall provide a written opinion to ADL that includes the following:

- Recommendation for further follow-up;
- Results of the medical examination and any associated tests;
- Any medical condition which may be revealed in the course of the examination which may place the employee at increased risk of exposure to a hazardous chemical found in the laboratory workplace;
- A statement that the employee has been informed by the physician of the results of the consultation of medical examination and any medical condition that may require further examination or treatment.

The physicians written opinion shall not reveal specific findings or diagnoses unrelated to occupational exposure.

For each employee, ADL shall establish and maintain an accurate record of any measurements taken to monitor employee exposure and any medical consultation and examinations including tests or written opinions required by the OSHA laboratory standard. These records shall be kept, transferred and made available in accordance with 29 CFR 1910.20 "Access to Employee Exposure and Medical Records."

Initial and Periodic medical exams consist of the following:

- A Health Status Questionnaire (HSQ) specifically developed for Arthur D. Little staff with emphasis on occupationally-related diseases;
- A comprehensive physical examination including hearing audiogram, vision, musculoskeletal, pulmonary, and cardiovascular systems, as deemed necessary by the Medical Center staff;
- Laboratory exams may include: a complete blood count differential, chemistry profile including sugar, liver profile, cholesterol, thyroid test, urinalysis, electrocardiogram, chest x-ray, pulmonary function test;
- A Tetanus-diphtheria will be offered if none has been administered in the past ten years.

Employees working with certain classes of chemicals may require additional testing. Examples include:

- Pesticides (organophosphates, carbamates, or cholinesterase inhibitors): red blood cell and serum (total) cholinesterase level testing;
- Arsenic: 24-hour arsenic level determination and chest x-ray;
- Respirator users: pulmonary function test (PFT) which is repeated every three years;
- Bloodborne pathogens if the individual is a qualified first aid/CPR responder.

Contact the Medical Center at extension 5100 for additional information.

2.4 Record Keeping

Site/project management will coordinate with laboratory management to ensure that accurate and complete records are established and maintained concerning:

- Medical surveillance
- Hood and chemical enclosure monitoring
- Chemical inventory
- Training
- Exposure monitoring
- Accident reports
- Spill reports

3.0 Laboratory Practice Policies

This section of the EHS Chemical Hygiene Plan for Field Operations provides in-depth guidance to good laboratory practice and technical assistance on the proper use of containment and safety equipment, and personal protective equipment (PPE).

Good laboratory practice rests on continual observance of several fundamental principles of general chemical hygiene and housekeeping. EHS shall ensure that all laboratory containment and safety equipment is functioning properly, and that specific measures, outlined as follows, are taken to ensure proper and adequate performance of such equipment.

Personal Protective Equipment (PPE) is a critical control measure to help prevent employee exposures. EHS laboratory employees shall minimally use the following PPE:

- Laboratory coat;
- Eye protection (e.g. suitable for hazards encountered, chemical goggles for handling corrosives);
- Proper chemically resistant gloves when skin contact with chemicals is likely;
- Safety Shoes, when appropriate.

Visitors will wear eye protection when in the lab and, when deemed appropriate, other special PPE.

Also described in the following SOPs are the monitoring programs for exhaust hoods and vented enclosures, and the inspection and maintenance program for safety equipment.

3.1 (SOP) General Chemical Hygiene Practices

3.1.1 Behavior

- Avoid practical jokes or other behavior which might confuse, startle or distract another worker.

3.1.2 Personal Protective Equipment

- Wear fully-buttoned laboratory clothes, coats, or disposable clothing (as required) in all work areas. Wear clothing appropriate to perform laboratory tasks and functions. (E.g. wear pants when doing sample preparation or working with acids or bases.)
- Wear shoes at all times in the laboratory. Do not wear sandals or open-toe shoes.
- Secure long hair from open flames, moving equipment and other potentially hazardous situations.

3.1.3 Planning

- Assemble all required materials before beginning a task.
- Plan appropriate protective procedures and positioning of equipment and chemicals before beginning any new task.

3.1.4 Preventing Chemical Ingestion

- Do not smell or taste chemicals or samples.
- Where practical always keep chemicals in the laboratory area. Do not bring any chemicals into office areas.
- Do not eat, drink, smoke, chew gum or tobacco, or apply cosmetics in areas where laboratory chemicals are present.
- Wash hands frequently and wash hands before eating, drinking, etc.
- Handling, consumption, and/or storage of food or beverages in laboratory areas and chemical storage refrigerators is prohibited. Do not use glassware or utensils used for laboratory operations for food and beverage handling and/or storage.
- Use a pipette bulb or mechanical pipetting devices; do not use mouth suction for pipetting or starting a siphon.

3.1.5 Equipment

- Use equipment only for its designed purpose and in accordance with safe operating procedures. Store all equipment properly (e.g. on structurally adequate support in appropriate casing, etc.).

3.1.6 Decontamination

- Wash hands and areas of exposed skin well before leaving the laboratory. Never use solvent for washing.
- Discard contaminated personal protective equipment appropriately.

3.1.7 Vigilance

- Be alert to unsafe conditions and see that **they are corrected**. Report unsafe conditions to the site supervisor, a Chemical Hygiene Committee member and/or the Field Safety Officer.

3.1.8 Working Limitations

- It is sensible not to work alone in a laboratory.
- Under normal, relatively non-hazardous conditions, make arrangements with another individual for frequent and periodic checks when working alone in a laboratory. This may include security personnel.
- Do not work alone in a laboratory if the procedures conducted are hazardous.
- The case manager has the responsibility to determine if special precautions are necessary, such as having two people in a laboratory during a particular procedure.

- Requests for exceptions to these rules require a written memorandum request to, and approval by, the CHC.

3.2 (SOP) Housekeeping

3.2.1 Working Conditions

- Keep work areas clean and uncluttered. Maintain active experiments in a state of minimal clutter with adequate labeling.
- Protect work surfaces (lab benches, tops, hoods) from contamination and clean thoroughly after use.
- Keep all aisles and hallways free of chemical containers and clutter.
- Do not hang clothing on or near radiators, steam pipes, heating instruments, or open flames.

3.2.2 Cleanup

- Clean laboratory areas and benches at the end of each day.
- Clean floors regularly.
- Clean up apparatus on completion of an operation.
- Remove contaminated glassware from the work area at the end of each day or leave it in a hood to vent.

3.3 (SOP) Eye Protection

3.3.1 Applicability

- All laboratory personnel are required to possess and use safety glasses with side shields while working in the laboratory area.
- For some operations (e.g. working with corrosives, or if blow-back is possible), another form of eye protection may be necessary (see below).
- Persons (including visitors) who do not normally work in eye protection areas but who may pass through these areas occasionally are also required to wear eye protection. Temporary-type visitors glasses shall be stored in all laboratories and worn in such cases.
- Eye protection is required while performing or watching work where there is any reasonable probability of exposure of the eyes (e.g., when mixing chemicals on a bench top).

3.3.2 Types of Eye Protection Equipment

Impact Protection

- Safety glasses and impact resistant goggles are available for use in EHS laboratories.
- Regular prescription glasses are NOT safety glasses and may not be used in place of safety glasses. Prescription glasses are permitted in the laboratory if goggles are worn over them. Prescription safety goggles are available. Contact Rich Morrill for further information at extension 6310.

Splash Protection.

- In areas where the likelihood of splashes may be high, specific protection shall be worn.
- Goggles, face shields and plastic splash guards are available.
- Face shields shall be worn when corrosive chemicals (e.g., acid and alkaline) are handled in open containers or are being transferred. Face shields shall also be worn whenever more complete protection of the face and neck is needed.
- Barrier shields may be used if appropriate.

Vapors

- Gas-tight goggles shall be worn where hazardous chemical vapors are not otherwise controlled.

Contact Lenses

- Contact lenses are not recommended in the laboratory. If contact lenses are worn adequate eye protection is still necessary.

A wide variety of eye protection equipment is available through the Corporate Health and Safety Advisor, Richard Morrill at extension 6310.

3.4 (SOP) Glove Selection and Use

3.4.1 Applicability

All laboratory employees shall wear chemical-resistant gloves under the following conditions:

- Whenever potential for contact with corrosive or toxic materials and/or materials of unknown toxicity exists.
- Whenever protection is needed against accidental exposure to chemicals.

Use latex or N-dex gloves for general use.

Wear coated work gloves whenever it is necessary to handle rough or sharp-edged objects.

Thermal gloves are to be worn when handling cryogenic materials or hot materials.

3.4.2 Selection

- Proper glove selection and use is dependent on the chemical resistance/ permeability of the glove material to the chemical, as described in section 3.4.3.
- The lead chemist shall work with the site supervisor and the Field Safety Officer to ensure that gloves are selected and used according to these guidelines.

3.4.3 Chemical Resistance/Permeability

- The extent to which a particular substance penetrates through a glove material is defined as its permeation rate and breakthrough time. In general, permeation of a substance through a glove or clothing material depends on at least four factors:
 - Temperature The permeation rate increases with increasing temperature.
 - Thickness The time required to permeate through a material increases with the increasing thickness of a material.
 - Solubility Generally, the permeability of a liquid is higher if the material of the protective garment is soluble in (with) the chemical. However, the solubility cannot always be used as a predictor of permeability.
 - Multicomponent liquids The rate at which a substance permeates can be accelerated in the presence of another, more rapidly permeating component.

Though qualitative permeation data are available from many manufacturers, relatively few have conducted in-house quantitative experiments. However, more permeability data are becoming available from both manufacturers and testing laboratories. It must be understood that no material is 100% impermeable to anything, and no one material will form a satisfactory barrier against all substances. The performance of barrier materials against various chemicals should be evaluated on a substance-by-substance basis.

Figure 5 provides information on the resistance to common laboratory chemicals of common glove materials.

Figure 6 illustrates other physical properties to be considered when selecting protective materials.

It is always best to obtain data from the glove manufacturer with regard to chemical resistance, permeability, etc.

3.4.4 Inspection

- Before each use, inspect gloves for discoloration, punctures, and tears.
- Do not use defective gloves.

3.4.5 Replacement

- Replace gloves periodically, depending on frequency of use and permeability to substance(s) handled.
- Dispose of or decontaminate contaminated gloves quickly and appropriately.

Chemical	Natural Rubber	Neoprene	Nitrile	Vinyl
Acetaldehyde	G	G	E	G
Acetic acid	E	E	E	E
Acetone	G	G	G	F
Acrylonitrile	P	G	-	F
Ammonium hydroxide (sat)	G	E	E	E
Aniline	F	G	E	G
Benzaldehyde	F	F	E	G
Benzene ^a	P	F	G	F
Benzyl Chloride ^a	F	P	G	P
Bromine	G	G	-	G
Butane	P	E	-	P
Butyraldehyde	P	G	-	G
Calcium hypochlorite	P	G	G	G
Carbon disulfide	P	P	G	F
Carbon tetrachloride ^a	P	F	G	F
Chlorine	G	G	-	G
Chloroacetone	F	E	-	P
Chloroform ^a	P	F	G	P
Chromic acid	P	F	F	E
Cyclohexane	F	E	-	P
Dibenzyl ether	F	G	-	P
Dibutyl phthalate	F	G	-	P
Diethanolamine	F	E	-	E
Diethyl ether	F	G	E	P
Dimethyl sulfoxide ^b	-	-	-	-
Ethyl acetate	F	G	G	F
Ethylene dichloride ^a	P	F	G	P
Ethylene glycol	G	G	E	E
Ethylene trichloride ^a	P	P	-	P
Fluorine	G	G	-	G
Formaldehyde	G	E	E	E
Formic acid	G	E	E	E
Glycerol	G	G	E	E
Hexane	P	E	-	P
Hydrobromic acid (40%)	G	E	-	E

Figure 5 Resistance to Chemicals of Common Glove Materials
(E = Excellent, G = Good, F = Fair, P = Poor)

Chemical	Natural Rubber	Neoprene	Nitrile	Vinyl
Hydrochloric acid (conc)	G	G	G	E
Hydrofluoric acid (30%)	G	G	G	E
Hydrogen peroxide	G	G	G	E
Iodine	G	G	-	G
Methylamine	G	G	E	E
Methyl cellosolve	F	E	-	P
Methyl chloride ^a	P	E	-	P
Methyl ethyl ketone	F	G	G	P
Methylene chloride ^a	F	F	G	F
Monoethanolamine	F	E	-	E
Morpholine	F	E	-	E
Naphthalene ^a	G	G	E	G
Nitric acid (conc)	P	P	P	G
Perchloric acid	F	G	F	E
Phenol	G	E	-	E
Phosphoric acid	G	E	-	E
Potassium hydroxide (sat)	G	G	G	E
Propylene dichloride ^a	P	F	-	P
Sodium hydroxide	G	G	G	E
Sodium hypochlorite	G	P	F	G
Sulfuric acid (conc)	G	G	F	G
Toluene ^a	P	F	G	F
Trichloroethylene ^a	P	F	G	F
Tricresyl phosphate	P	F	-	F
Triethanolamine	F	E	E	E
Trinitrotoluene	P	E	-	P

Source: Prudent Practices for Handling
Hazardous Chemicals in
Laboratories

- ^a Aromatic and halogenated hydrocarbons will attack all types of natural and synthetic glove materials. Should swelling occur, the user should change to fresh gloves and allow the swollen gloves to dry and return to normal.
- ^b No data on the resistance to dimethyl sulfoxide of natural rubber, neoprene, nitrile rubber, or vinyl materials are available; the manufacturer of the substance recommends the use of butyl rubber gloves.

Figure 5 (continued) Resistance to Chemicals of Common Glove Materials (E = Excellent, G = Good, F = Fair, P = Poor)

Coated Work Gloves

Molded Handwear

	Neoprene	Python Neoprene	Ripple texture	Multi purpose	Utility	Flexible vinyl plastic	Super flexible vinyl plastic	Natural latex gloves	Latex nitrile gloves	Synthetic bayprene rubber gloves	Baytex gloves
Abrasion resistance	G	G	G	E	E	E	E	G	E	G	G
Cut resistance	E	E	E	R	N	NR	E	E	E	E	E
Snag resistance	E	E	E	G	G	G	E	E	E	E	E
Heat resistance	G	G	E	F	F	F	F	E	G	G	E
Low-temperature resistance	E	E	E	G	F	G	E	E	E	E	E
Flexibility	G	G	F	E	E	E	E	G	G	G	G
Dry grip	E	G	E	E	E	E	E	E	E	G	E
Wet grip	F	E	E	E	F	E	G	E	G	E	E

E = Excellent,
 G = Good,
 F = Fair,
 NR = Not Recommended.

Figure 6 Physical Properties Chart

3.5 (SOP) Respirators

3.5.1 Provision

- EHS shall provide proper respiratory protection equipment to employees at no cost in accordance with 29 CFR 1910.134, "Respiratory Protection," where the use of respirators is necessary to maintain exposure below permissible exposure limits.

3.5.2 Applicability

- The EHS Chemical Hygiene Committee shall determine when the use of respiratory protection equipment is necessary. In general, respirators are not required for normal, routine laboratory operations.
- Prior to issuing a respirator to a worker, the worker must be trained in its use, fit-tested for the specific model respirator to be used and receive medical approval from the ADL medical center to use the type of respirator chosen.
- EHS laboratory employees required to wear respirators for laboratory-related routine work or emergency response, must be in compliance with the OSHA Respiratory Protection Standard (29 CFR 1910.134) and follow the provisions of the Arthur D. Little corporate respiratory program (Appendix D).
- Contact Richard Morrill (extension 6310) for more information about the criteria for respirator use.

3.6 (SOP) Special Personal Protective Equipment (PPE)

3.6.1 Applicability

- Material Safety Data Sheets (MSDS) may list whether special PPE is needed when working with that particular chemical. The CHC will select and communicate to laboratory workers whenever particular laboratory environments and/or tasks require the use of "special" personal protective equipment.

3.6.2 Selection

- Selection of special PPE shall be based on:
 - Knowledge of the hazards present and protection required (e.g., flame resistance, splash protection)
 - Functional compatibility among pieces in an multi-component ensemble (e.g., respirators and eye protection)
 - Limitations of the PPE selected (e.g., permeation characteristics, breakthrough time, breathability, ease of movement)

- Cost and re-use factors
- Fit

3.6.3 Types

- Special PPE may include:
 - Bonnet
 - Hood
 - Sleeves
 - Coat
 - Jacket
 - Pants
 - Apron
 - Bib-overalls
 - Coveralls
 - Full-body encapsulating suit
 - Boots
 - Shoe covers
- These items may be constructed of the following materials:
 - Disposable: Tyvek (coated and non-coated), Kleenguard
 - Non-disposable: neoprene, natural rubber, butyl rubber, gore-tex, cotton

Figures 5 and 6 illustrate other physical properties to be considered when selecting protective materials.

3.6.4 Inspection

- Before each use, inspect PPE for discoloration, punctures, tears, imperfect seams, malfunctioning closures, etc.
- Inspect PPE periodically during use.

3.6.5 Replacement

- Remove and appropriately discard any item that has been physically damaged or chemically degraded and replace as soon as safely possible. This should be done in a manner that restricts the transfer of chemical from the work area, and prevents contact between personnel and the outside of the contaminated garment.
- Decontaminate and clean reusable PPE as necessary.

3.7 (SOP) Glassware Handling

3.7.1 Use

- Handle and store laboratory glassware with care to avoid damage and injury. Inspect glass before use.
- Dispose of chipped, cracked, or badly etched glass.
- Do not use damaged glassware.
- Glass tubing and rods must be fire polished and stored properly.
- Use a lubricant when pushing glass through rubber stoppers.
- When stressing glass, always wear appropriate gloves. Refer to SOP 3.4.
- Use both hands when picking up containers.
- Use an appropriate device for carrying containers such as caddies, carts, or cartons.
- Use shatterproof glass containers whenever possible.

3.7.2 Pressure or Vacuum

- Glass under pressure or vacuum must be:
 - Wrapped in plastic or metal taping.
 - Kept clear from impact, falling objects, personnel, and other equipment.
- Use shielding to protect against flying glass.

3.7.3 Heated Glassware

- Use tongs or heat-resistant gloves when handling heated glassware.

3.7.4 Cleanup and Disposal

- Always clean up broken glass immediately. Refer to SOP 3.4 to determine the appropriate gloves needed.
- To dispose of glassware:
 - Place in a proper container and label container as broken glass.
 - Cover glass.
 - Dispose of properly.
- Take appropriate action to prevent unintended reuse of disposed glassware.

3.8 (SOP) Inspections

3.8.1 Policy

- Laboratory and site management shall coordinate with safety and maintenance staff to ensure that inspection and maintenance of safety equipment are performed properly.
- Formal housekeeping and chemical hygiene inspections shall be conducted monthly by the site supervisor (or designee) and/or a member of CHC, or the Field Safety Officer.
- Figure 7 is the outline of inspection procedure.

3.8.2 Content and Schedule

- Inspections shall minimally consist of the items listed in the "Safety Checklist" (Figure 8).
- Inspect eyewash stations monthly.
- Test safety showers biannually.
- Regularly inspect other safety equipment at intervals of approximately 3 to 6 months.
- Face velocity monitoring of ventilation hoods will be performed as needed by EHS staff and yearly by a vendor or qualified individual.

3.8.3 Employee Responsibility

- All laboratory employees shall repeatedly inspect the laboratory to insure compliance with the Chemical Hygiene Plan.

Each laboratory will be inspected periodically for adherence to basic safety standards. The points to be checked are listed below. If a particular area needs attention, the appropriate person (i.e., individual and/or maintenance person) will be notified. If that condition still exists at the next inspection, a memo will be sent to the responsible section manager.

The objectives of these inspections are improved working conditions and personnel safety. To achieve these goals, individual cooperation is essential.

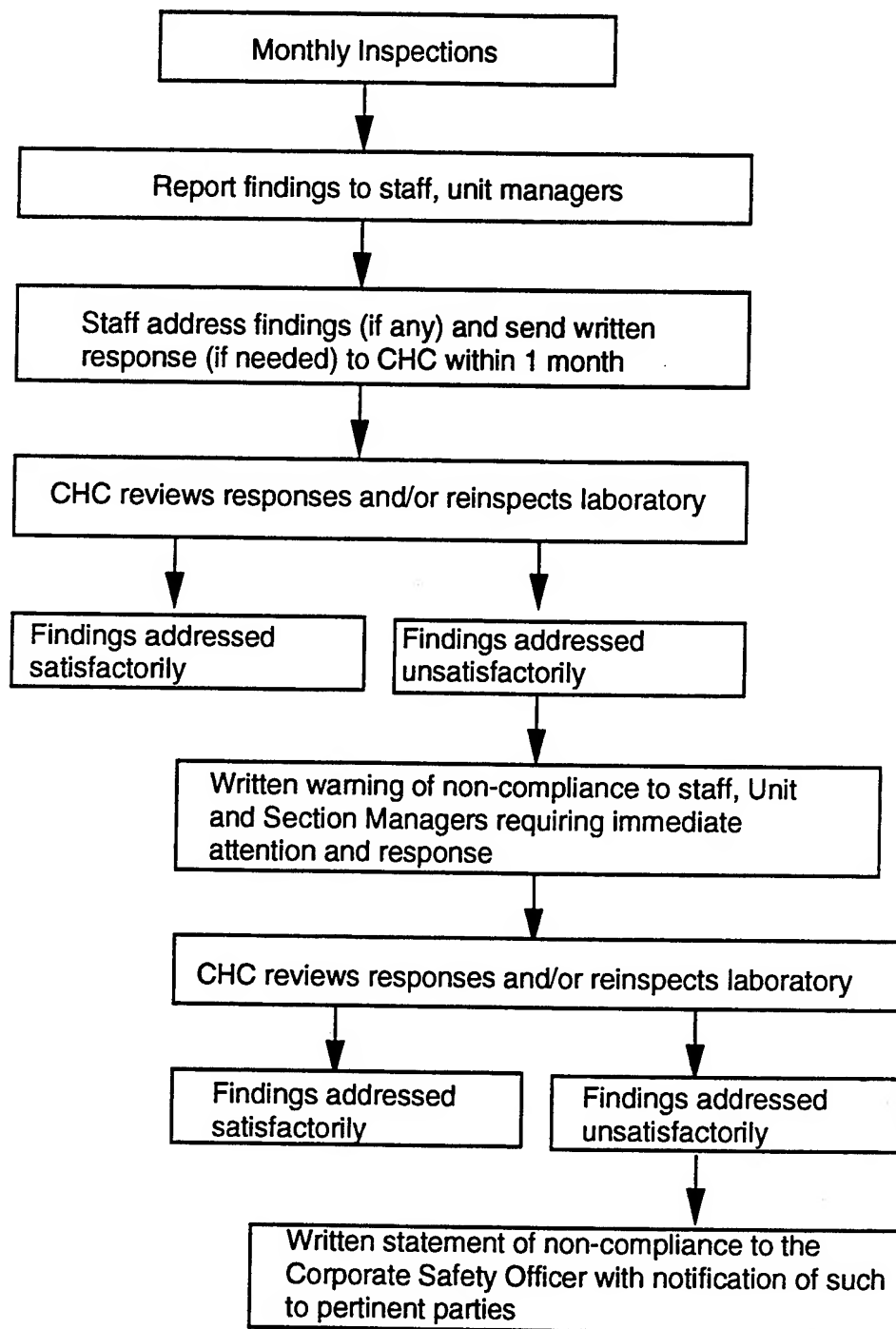


Figure 7 Flow Chart of Inspection Process

Item	Yes	No	N.A.*
1. Is the work area generally clean and neat?	_____	_____	_____
2. Is there evidence of fugitive animals or cockroaches?	_____	_____	_____
3. Is Laboratory safety equipment in place and working?			
(a) Eyewash	_____	_____	_____
(b) Safety shower (checked by maintenance biannually)	_____	_____	_____
(c) Fire extinguisher	_____	_____	_____
(d) Blanket (not necessary if shower is present)	_____	_____	_____
(e) Spill kits	_____	_____	_____
(f) Other (reactor shields, reagent bottle carriers, etc.)	_____	_____	_____
(g) Are emergency exits cleared and posted?	_____	_____	_____
(h) Are fire doors closed?	_____	_____	_____
(i) Are sprinkler systems clear (nothing within 18 inches)?	_____	_____	_____
4. Are electrical devices, cords and connections safe?	_____	_____	_____
5. Are mechanical devices safe?	_____	_____	_____
6. Is there adequate ventilation (exhaust hoods functional and validated, room in general)?	_____	_____	_____

Figure 8 Safety Checklist

Item	Yes	No	N.A.*
7. Are gas cylinders secured in place?	_____	_____	_____
8. Is personal safety equipment available (e.g., first aid kit, glasses, face shields, aprons)?	_____	_____	_____
9. Is there evidence of food and/or smoking in labs?	_____	_____	_____
10. Is personal safety equipment being used when necessary?	_____	_____	_____
11. Are respirators properly stored in plastic bags?	_____	_____	_____
12. Are personnel observing safe work practices?	_____	_____	_____
13. Is there proper storage and labelling of:			
(a) Solvents?	_____	_____	_____
(b) Chemicals, including chemical hazards?	_____	_____	_____
(c) Biohazards?	_____	_____	_____
(d) Radioactive materials?	_____	_____	_____
14. Is waste disposal adequate?			
(a) Segregation of halogenated and non-halogenated solvents?	_____	_____	_____
(b) Have out-dated chemicals, particularly peroxidizable solvents, been discarded?	_____	_____	_____
(c) Is radioactive waste, chemical waste, biohazard waste, etc., properly segregated?	_____	_____	_____

Figure 8 Safety Checklist (continued)

Item	Yes	No	N.A.*
(d) If a barrel for disposal of chemical waste is in the lab, is a proper log of the contents being kept?	_____	_____	_____
(e) Are containers labelled?	_____	_____	_____
15. Is the area properly posted for radioactivity, biohazards or chemical hazards?	_____	_____	_____
16. Are SOPs available for proper handling and disposal of:			
(a) Radioactive materials?	_____	_____	_____
(b) Carcinogens and chemical hazards?	_____	_____	_____
(c) Biohazards?	_____	_____	_____
17. Is defective glassware <i>absent</i> ?	_____	_____	_____
18. Have sink traps been filled?	_____	_____	_____
19. Have solvent cabinet flame arresters been cleaned?	_____	_____	_____
20. Are log books (e.g. chemical hazards inventory) up to date?	_____	_____	_____

Figure 8 Safety Checklist (continued)

3.9 (SOP) Monitoring Chemical Ventilation Hoods and Vented Enclosures

3.9.1 Daily Visual Inspection

- Before beginning any operations in a hood, visual inspection is to be performed by the person using the equipment, as described below.
- If it appears that the hood is not functioning properly, immediately notify the site supervisor and indicate (e.g., sign) on the hood that it is not to be used.
- No work involving hazardous materials is to be conducted in the hood or vented enclosure until the problem has been corrected.
- When the problem is corrected, indicate on the hood that it is safe for use.

Procedure for Conducting Daily Visual Inspection:

1. Inspect exhaust slots at the rear of the hoods. Slots must be clear and in the proper position.
2. For hoods with adjustable sashes and a mark for the proper sash height, make sure that the sash is at the proper height. This is marked on the front of the hood beside the sash.

Most chemical fume hoods are designed to pull 80-120 ft/min at any sash height. Most biological hoods are designed to pull 80-120 ft/min at a particular sash height. If you have any questions contact a CHC member.

3. If the hood is equipped with a pressure or face velocity gauge, check the gauge to ensure that measurements are within acceptable ranges as marked on the gauge. If the hood is not equipped with a gauge, use a vaneometer to determine the hood air flow rate.

3.9.2 Periodic Inspection

- The lead chemist or designee will perform face velocity measurements at the initiation of lab operations and periodically thereafter.
- The monitoring shall include a verification of the rate and direction of air flow, as determined by measurement of the face velocity and smoke tube tests.
- Results of the inspections shall be maintained on site and also submitted to the CHC. The form that is to be used to record the results of the inspection is contained in Figure 9.
- Smoke tube tests shall be used to evaluate direction of air flow and to determine if there are any irregular or turbulent airflow patterns.

Procedure for Conducting Smoke Tests of Chemical Fume Hoods and Vented Enclosures:

1. Adjust the sash to the proper position. Smoke released several inches in front of the hood or vented enclosures should move directly to the exhaust slot.
2. Release smoke from the tube at or above the interior working space to locate any dead or turbulent areas.
3. Record the results as satisfactory or unsatisfactory on the ventilation inspection form (Figure 9).

Procedures for Measurement of Face Velocity for Chemical Fume Hoods and Vented Enclosures:

Hood face velocities are determined with a calibrated thermal or mechanical velometer at a minimum of three positions (left, center, right). If the hood is connected to other hoods, measure the face velocity under the conditions of "maximum" use.

1. Adjust sash height to marked operating level. Turn off auxiliary air.
2. Using the velometer, measure the air flow at 3 sites (left, center, right) for hoods with a face opening of 2 feet or less (Figure A). For hoods with a face opening or greater than 2 feet, 6 determinations are made (top - left, center, right, and bottom - left, center, right) (Figure B). Record results for each determination on the standard form for face velocity tests. (See Figure 4)

Figure A

Air flow determination sites for hoods with sash height face openings of 2 feet or less.

left	center	right
1	2	3

Figure B

Air flow determination sites for hoods with sash height face openings of greater than 2 feet.

	left	center	right
top	1	2	3
bottom	4	5	6

3. Calculate the average velocity for the hood.

Face velocities for chemical fume hoods should average approximately 100 ± 20 feet per minute (fpm) at the operating sash site. No individual point should be outside the minimum (80 fpm) and the maximum (120 fpm) unless it is demonstrated by smoke tube testing that flows above 120 fpm provide adequate capture and no significant turbulence.

Hood Velocity Testing

A	B	C
C	D	E

Hood: _____

A _____	G _____
B _____	H _____
C _____	I _____
D _____	J _____
E _____	K _____
F _____	L _____

Location: _____

Tester: _____

Date: _____

G	H	I
J	K	L

Hood: _____

A _____	G _____
B _____	H _____
C _____	I _____
D _____	J _____
E _____	K _____
F _____	L _____

Comments: _____

Figure 9 Hood Face Velocity Monitoring

4. If the face velocity meets the requirements specified above, mark the hood to indicate the operational sash height (only for hoods that are not compensating), face velocity, and date testing was done. Do not use hood that does not meet the requirements specified above until proper maintenance is performed.
5. Record the results. (See Figure 9)

3.9.3 Yearly Inspections

- Where applicable all hoods will be inspected yearly by a certified individual.
- This inspection will be arranged by the Chemical Hygiene Chairperson.

3.9.4 Safe Practices for Chemical Fume Hoods

- Hoods should be positioned away from doors, windows, and busy walkways.
- Use a hood or other local ventilation device when working with any appreciable volatile substance with a threshold limit value (TLV) of less than 50 ppm.
- Always use the hood for operations which might result in the release of toxic chemicals, vapors or dust.
- Place equipment well inside hood, approximately 9-12 inches.
- If heat sources (burners) are used in the hood, open exhaust slots at top of hood and increase total velocity.
- Keep materials stored in hoods to a minimum and do not allow them to block vents or air flow.
- Do not allow the hood to become a storage area.
- Do not raise the sash above the marked sash height (if one is marked) while operating.
- Leave the hood "on" when it is not in active use if toxic substances are stored inside, or if it is uncertain whether adequate general lab ventilation will be maintained when hood is "off."
- Do not use hoods to evaporate liquids as a means of waste disposal.

See Appendix C (Arthur D. Little Health and Safety Policy and Guidelines) for additional information

3.10 (SOP) Fire Safety

3.10.1 General

Field laboratory operations shall comply with applicable state and local fire and building codes.

3.10.2 Flammable Liquids

Flammable liquids must be stored and handled in a manner that will reduce the risk of fire and/or an explosion. This includes the following:

- Flammable liquids (defined as those with flash points below 140 °F) are segregated from other hazardous materials such as acids, bases and oxidizers. These are stored in flammable-liquid storage cabinets. These cabinets are constructed in accordance with storage cabinet requirements for flammable liquid storage within buildings.
- Store only the quantity of solvents needed to support the project.
- Flammable liquids that require refrigeration will be stored in explosion-proof refrigerators. All explosion-proof refrigerators shall be labelled as such.
- When especially flammable solvents such as diethyl ether are in use, conspicuously post warning signs in the laboratory.
- Transfer flammable liquid in a designated storage room or over a tray within an effective hood. All transfer drums must be grounded and bonded, and be equipped with pressure-relief devices and dead-man valves.
- Flammable liquids will be stored whenever feasible in metal safety cans.
- Keep flammable compounds away from ignition source, such as an open flame.

3.10.3 Emergency Evacuation

If you discover a fire, smoke, or similar emergency, immediately:

1. Notify personnel in the immediate area to evacuate.
2. Attempt to extinguish a fire if the individuals are so trained.
3. Evacuate the area and proceed to the appropriate rally point.
4. Contact the fire department noted in the site emergency plan.

Reference section 9 for more information on the emergency evacuation procedure.

3.10.4 Fire Extinguishers

These are to be conspicuously located where they will be readily accessible and immediately available in the event of fire. The specific type and size of extinguisher shall be selected through Corporate Safety with consideration for the hazards to be protected

and the strength of the personnel who might use the extinguishers. Contact Rich Morrill at 6310 for information.

3.10.5 Fire Safety Training

All personnel receive initial training in fire safety. Course material includes hazard awareness, proper techniques for the handling and storage of flammable liquids, and a briefing on the alarm systems and emergency evacuation preplanning. Hands-on training in the use of fire extinguishers is provided to appropriate personnel. Under the supervision of a member of Corporate Safety, laboratory personnel practice extinguishing different types of fires using the appropriate extinguisher.

3.11 Specific Analytical Methods Safety Procedures

At present, the type of analytical laboratory procedures used in field operations include, but are not limited to, the following methods:

- Nondispersible InfraRed Spectrometry (NDIR)
- Gas chromatography (GC)
- Sonic probe

The following specific analytical methods are currently used in the above laboratory procedures: EPA Method 418.1 (Total Petroleum Hydrocarbons), EPA Method 601 (Volatile Halogenated Compounds), EPA Method 602 (Aromatics), and EPA Method 608 (Pesticides/PCBs). Analytical Methods Safety Sheets and Material Safety Data Sheets (MSDSs) are available for these methods in Attachment 1.

For other procedures, the lead chemist for the project will be responsible for completing an Analytical Methods Safety Sheet (Figure 10), attaching the applicable MSDSs, and for ensuring review by a representative from the Occupational Safety and Health Unit prior to conducting on-site lab activities.

ANALYTICAL METHODS SAFETY SHEET

This form must be filled out by the Head Chemist and submitted to an Occupational Safety & Health representative for review before beginning any field laboratory activities.

Project location: _____

Head Chemist: _____

Estimated project start date: _____

Other chemists on project: _____

Estimated project end date: _____

Analytical method: _____

Frequency of use: _____ hrs/day

Analyte(s): _____

Solvent(s): _____

Compressed gas(es): _____

Associated Physical/Health Hazards

At the top of each column, list any chemicals to be used and check, or fill in, any applicable boxes. See Figure 5 and Appendices B and F for guidance.

Chemical							
Characteristic Hazard							
Irritant							
Corrosive							
Toxic (acute/chronic)							
Carcinogen/Mutagen/Teratogen (write C,M, or T)							
Flammable							
Reactive (i.e., explosive, pyrophoric, unstable, water-reactive, oxidizer, sensitizer, other)							
Other (list hazard)							

If any radioactive substances are to be used or encountered, contact the ADL Radiation Safety Officer, Susan Burrill (x6221).

If on-site hazardous wastes are to be generated as part of the laboratory procedures, contact Rich Morrill (x6310) for direction, guidance, materials, and supplies (i.e., labels, containers, etc.)

Pertinent MSDSs for hazardous materials to be used should be attached to this Safety Sheet prior to submittal.

Check any control measures which are needed:

Enclosure of process	_____	Special refrigeration of chemicals	_____
Isolation of process (space or time)	_____	Special waste containers	_____
Local/general exhaust ventilation	_____	(specify) _____	_____
Sharps disposal	_____	Continuous area monitoring	_____
Flammable storage cabinets	_____	(pre-set alarms)	_____
Grounding/bonding devices	_____	Corrosive storage cabinets	_____

Other:

Check any safety equipment which is needed:

Safety shower	_____	Eye wash	_____
Spill response kit	_____	Safety shoes	_____
Gloves: thermal, latex, or _____	_____	Lab coat or apron	_____
Reagent bottle carrier	_____	Safety glasses with side shields	_____
Splash goggles	_____	Respirator	_____
Fire extinguisher	_____	Cartridge type _____	_____
Fire blanket	_____	Face shield	_____
Bloodborne pathogen/First aid kit	_____	Ear plugs	_____

Other:

Figure 10 Analytical Methods Safety Sheet

4.0 Labeling and Material Safety Data Sheets

In accordance with requirements of 29 CFR 1910.1450 (h), the lead chemist and the site supervisor shall ensure that labels on incoming containers of hazardous chemicals are not removed or defaced. In addition, material safety data sheets (MSDSs) shall be maintained for all of hazardous chemicals, and be readily accessible to laboratory employees. The following SOPs provide instruction on maintaining MSDSs and proper procedures for posting signs and labels.

4.1 (SOP) Maintaining MSDSs

4.1.1 Requests

- For all "new" chemicals (not included in current inventories), the purchaser will request an MSDS from the manufacturer.
- Add MSDSs procured in this fashion to the MSDS files. Submit a copy of the MSDS to Richard Morrill.

4.1.2 Maintenance

- Each field laboratory will maintain MSDSs for the chemicals used and ensure that they are readily accessible to laboratory employees.
- Endeavor to have the MSDSs on file before chemicals are received.
- The lead chemist and the site supervisor shall ensure that MSDSs for chemicals used in their work areas reflect all necessary information.

4.1.3 Reminders

- When reading an MSDS, especially for purposes of hazard characterization, consider the following:

An MSDS often outlines only minimum precautions for the safe handling of a chemical including fire and explosion hazards, spill or leak procedures, special protection information, and special precautions. Thus, if ADL or EHS policy, or the reader's own judgment, suggests that more stringent procedures are appropriate, the most stringent precautions should be followed.

MSDS first aid procedures are often conservative and reflect a "worst case" scenario. In the absence of an informed opinion from a designated health professional, a prudent response is the best policy. MSDS first aid procedures should be followed.

When a MSDS fails to mention a particular detrimental health effects, one should not assume that the substance is hazard-free. The vendor may not have been privy to test results when the MSDS was prepared.

Expect each MSDS to be complete (i.e., no blank spaces). If no data are available, the MSDS should so state in the space provided. If an incomplete MSDS is received, question the supplier.

- Since an MSDS alone may not provide adequate information, particularly facility-specific information, the MSDS may be used to prepare a safety protocol. This may be especially useful for addressing the hazards of an operation rather than the individual chemical(s). This may also be accomplished through written operating procedures, manuals, etc. However, an MSDS must be maintained for each chemical used in a procedure.

4.2 (SOP) Signs and Labels

4.2.1 Signs

Post signs bearing the following information in the areas indicated:

- An emergency telephone number (local fire, police, etc.) placed near each telephone.
- Location signs for safety showers, eyewash stations, other safety and first aid equipment, and exits.
- Warnings in areas or on equipment where special or unusual hazards exist.
- Personal protective equipment requirements in designated areas.

4.2.2 Labels

- Place identity labels to indicate contents of containers (including waste receptacles), associated hazards, and the expiration date.
- Label all secondary containers of chemicals with at least the identity of their contents.
- Never remove or deface labels on chemical containers.

5.0 Procurement, Receipt, Distribution, Storage, and Transport of Hazardous Chemicals

The methods of procurement, receipt, distribution, storage, and transport of hazardous chemicals constitute important control measures for laboratories. Sound methods also help minimize potential employee exposures. The following SOPs address these important topics.

5.1 (SOP) Chemical Procurement, Receipt, and Distribution

5.1.1 Hazard Communication

- Before a substance is received, ensure that information on proper handling, storage, and disposal has been provided to those who will handle the substance.

5.1.2 Acceptance

- Do not accept a container without an adequate identifying label.

5.2 (SOP) Chemical Storage

5.2.1 Containers and Location

- Avoid storage on bench tops and in hoods.
- Use spill trays, spill and shatterproof containers, secondary containers, and proper receptacles as needed.

5.2.2 Identity

- All chemical containers must be properly identified and labeled. Minimally, this consists of the contents, concentration, any associated hazard(s), and the expiration date.

5.2.3 Incompatibility

- Segregate incompatible materials in the same chemical storage area. (See Chemical Incompatibility Table, Appendix B, or MSDS for further guidance).

5.2.4 Flammables

- Store flammable liquids away from heat, ignition sources, and direct sunlight.
- Store large quantities of flammable liquids (flashpoint less than 140° F) in a designated flammable solvent storage cabinet. Contact Rich Morrill for further information.
- Store flammables in metal safety cans, whenever possible. Use the cans only as recommended by the manufacturer, including the following safety practices:
 - Never disable the spring-loaded closure.
 - Always keep the flame arrestor screen in place; replace if punctured or damaged.

- If a reagent must be stored in glass for purity, place the glass container in a bottle carrier when transporting the chemical to lessen the danger of breakage.
- Small quantities (working amounts) of flammable chemicals may be stored on open shelves.
- Store flammable chemicals in flammable liquid storage cabinets that have been approved by Factory Mutual and/or listed by Underwriter's Laboratory and designed in accordance with Code No. 30 of the National Fire Protection Association (NFPA). Adhere to the following safety practices:
 - Store only compatible materials inside a cabinet.
 - Do not store paper, cardboard, or other combustible packaging material in a flammable liquid storage cabinet.
 - Do not overload cabinets; follow manufacturers' established quantity limits.
 - Follow NFPA guidelines for maximum allowable volumes.
- Minimize the quantities of flammable chemicals stored in each laboratory.

5.2.5 Gas Cylinders

- Gas cylinders must be fully secured at all times.
- Refer to SOP 6.2, "Safe Handling of Compressed Gases" for additional information.

5.2.6 Peroxides

- Label peroxide containing compounds with the date they were opened.
- Store peroxide containing compounds away from heat sources and light.
- Do not use metal containers since some metal oxides can promote the formation of peroxides.
- Use proper antioxidant inhibitors. Note: the inhibitor may be consumed over time, making the compound again sensitive to peroxidation.
- Test peroxide containing materials for peroxides every three months using test paper strips (diethyl and diisopropyl ether should be tested on a monthly basis). If the test is positive, the material must be treated to remove the peroxides, or must be discarded.

5.3 (SOP) Chemical Inventory

- Each field laboratory is responsible for maintaining a current case by case inventory.
- Properly discard all unneeded items promptly in accordance with existing local, state, and federal regulations. Contact Rich Morrill (6310) for assistance in disposing of hazardous waste.

- Visually examine stored chemicals periodically (at least monthly) for replacement, deterioration, and container integrity.

5.4 (SOP) Receipt

- Wherever possible laboratory chemicals should be sent directly from the manufacturer/distributor to the site. An MSDS needs to accompany the shipment.
- If this is not practical, shipments should be received at the Arthur D. Little Receiving Department and then distributed to the appropriate personnel.
- If you are expecting a chemical with special hazards or handling instructions (e.g. radioactive materials), alert the receiving department of all pertinent information prior to the expected date of receipt.

5.5 (SOP) Transfer of Hazardous Chemicals

- Use carts with sides to transport chemicals whenever possible.
- Before moving containers, check and tighten caps, taps, or other closures.
- Use secondary containers to transport hazardous chemicals.

5.6 (SOP) Shipment of Hazardous Chemicals

5.6.1 External Shipments

All shipments of hazardous materials must be properly packaged and labeled according to DOT requirements. Before shipping a chemical hazard, consult the Arthur D. Little Shipping Department for the proper shipping procedures, labels, and containers.

5.6.2 Transporting Hazardous Chemicals Between ADL Facilities or Field Sites

- Alert the receiving laboratory of the shipment.
- Whenever possible avoid transporting chemicals to work sites.
- If chemicals must be transported over the road, specific DOT requirements must be met. Personnel must be trained (HM 181 and 126F), the material must be properly packaged and labelled, and shipping papers and an MSDS must accompany the shipment. Contact John Moskal at 6121 or the shipping department for additional information and guidance.
- The case leader must maintain detailed records of the shipment.

6.0 Handling of Hazardous Chemicals

Among the many tasks and operations performed daily by laboratory employees, those involving direct handling of hazardous chemicals pose the greatest potential for exposure. For this reason, specialized handling precautions and good laboratory practices have been developed for specific classes of chemical and physical hazards. Refer to the definitions contained in 29 CFR 1910.1450 and 1910.1200 for hazard classes.

6.1 (SOP) Handling Hazardous Chemicals

6.1.1 General

- Chemical ventilation hoods are specified as "designated areas" in laboratories and shall be used to control exposures to "particularly hazardous substances," per 29 CFR 1910.1450.
- Use only chemicals for which the quality of the available ventilation system is appropriate.
- Wear protective equipment during all chemical handling operations (refer to Section 3).
- The Chemical Hygiene Committee and/or the Field Safety Officer may institute additional control measures and specific precautions for chemical handling when appropriate.

6.2 (SOP) Corrosives [Acids and Bases]

6.2.1 Definition

- A corrosive material is any solid, liquid or gaseous substance that attacks building materials, or metals, burns, irritates, or destructively attacks organic tissues, most notably skin, and when taken internally, the stomach and lungs.

6.2.2 Handling

- As applicable, wear appropriate personal protective clothing, an acid-resistant apron, chemical-resistant gloves, and splash goggles/face shield.
- Conduct the procedure in a ventilation hood.
- Add acids into water, and never add water to acids.
- Perform all dilutions of corrosives in a chemical ventilation hood.
- Keep corrosives away from flammable liquids.

6.3 (SOP) Flammables

6.3.1 Definition

- National Fire Protection Association (NFPA) and Department of Transportation (DOT) define a "flammable liquid" as a liquid with a flash point below 140° F (37.8° C) and a "flammable solid" as a solid which will ignite readily or is liable to cause fires under ordinary conditions through friction or retained heat from manufacturing or processing, which burn vigorously and persistently as to create a serious hazard.

6.3.2 Handling

- Keep flammable compounds away from ignition sources such as an open flame.
- Conduct procedures in a ventilation hood, especially when transferring chemicals from one container to another or while heating in an open container.
- When flammable liquids are transferred in metal equipment, minimize the generation of static sparks by using bonding and ground straps as appropriate.
- Heat flammables in steam, water, oil, hot air baths, or uninsulated resistance heaters.
- Be certain that there are no sources of ignition near enough to cause a fire or explosion in the event of a vapor release or liquid spill.
- Keep flammables away from oxidizers and corrosives.

6.4 (SOP) Peroxides

6.4.1 Definition

- A peroxide is a strong oxidizing agent and is a fire hazard when in contact with combustible materials, especially under high-temperature conditions. Organic peroxides are low-power explosives, hazardous because of their extreme sensitivity to shock, sparks, or other forms of accidental ignition.

6.4.2 Handling

- Limit quantities to the minimum required.
- Do not return unused peroxides to storage container.
- Do not use solutions of peroxides in volatile substances under conditions in which the solvent may be vaporized, increasing the peroxide concentration of the solution.
- Use ceramic or wooden spatulas; do not transfer peroxides with metal spatulas because metal contamination can lead to explosive decomposition.
- Keep peroxides and all oxidizers segregated from organics/solvents.

- Avoid all heat sources, open flames, and smoking.
- Clean all spills immediately. Solutions of peroxides can be absorbed on vermiculite.
- The sensitivity of most peroxides to heat and shock can be reduced by dilution with inert solvents, such as aliphatic hydrocarbons. However, toluene is known to induce diacyl peroxide decomposition.
- Avoid friction, grinding, and all forms of impact near peroxides (especially solid ones). Do not use glass containers with screw-cap lids or glass stoppers. Polyethylene bottles with screw-cap lids may be used.
- To minimize the rate of decomposition, store peroxides at the lowest temperature consistent with their solubility or freezing point. Do not store liquids or solutions of peroxides at lower than the temperature at which the peroxide freezes or precipitates because peroxides in those forms are extremely sensitive to shock and heat.

6.4.3 Disposal

- Dilute pure peroxides prior to disposal.
- Dispose of small quantities (25 g or less) by:
 - diluting with water to a concentration of 2% or less;
 - transferring the solution to a polyethylene bottle containing a solution of a reducing agent, such as ferrous sulfate or sodium bisulfate;
 - handling as any other waste chemical, except do not mix with other chemicals for disposal.
- Large quantities (more than 25 g) require special disposal procedures. Contact Richard Morrill (extension 6310) for additional information.

6.5(SOP) Carcinogens, Reproductive Toxins, Chemicals With a High Degree of Acute Toxicity, and Chemicals of Unknown Toxicity in greater than negligible quantities:

- Conduct procedure in a designated area (e.g., fume hood).
- Wear appropriate personal protection equipment including gloves, eye protection, lab coat, and a mask.
- Care should be taken when weighing solids to avoid creation of aerosols.
- Use the smallest amount of chemical that is consistent with the requirements of the work to be done.
- Decontaminate the work area when work is completed.

6.6 (SOP) Explosives

6.6.1 Definition

- Explosives are chemicals that cause a sudden, almost instantaneous release of pressure, gas, heat, toxic vapors, or a combination thereof, when subjected to mechanical shock, pressure, high temperature, or chemical action.

Caution: Special handling techniques and safety measures are necessary due to the unusual nature of explosives. Personnel must be properly trained in the handling of explosives prior to use. Safety review is mandatory prior to beginning work with explosives and whenever the scope of the work changes.

6.6.2 Handling

- Post a warning sign on the door to alert people that explosives are being handled.
- Segregate explosives from other chemicals.
- Always use a barrier for protection (examples include a tip-resistant bench shield, barricades, and guards).
- Wear a face shield with a "snap-on" throat protector at all times when the worker is in an exposed position (examples are when bench shields are moved aside, when transporting explosives).
- Use remote control equipment and tools to manipulate the systems from a safe distance. Examples include mechanical arms, long- and short-handled tongs, and stopcock turners.
- Wear proper gloves to reach behind a shielded area. Choose gloves with caution considering the properties and quantity of material(s) being worked with.
- Wear laboratory coats constructed of slow-burning material, with cloth buttons, at all times.
- Choose an area with no spark sources.
- The area must be electrostatically grounded.
- Any individual working with explosives must be electrostatically grounded.
- All explosives must be stored under lock and key.
- Prepare only 0.5 g of product in a single run. Consider the substrate, diluent, and energetic reactant to determine the explosive power of the reaction mixture.

6.7 (SOP) Radioactive Substances

Use of radioactive substances must be approved by the Corporate Radiation Safety Committee (Susan Burrill, chair) and the Chemical Hygiene Committee. Radioactive substance users must attend the corporate radioactive substance training. Reference the ADL Radiological Health & Safety Guide for additional information (copies are available from the Radiation Safety Officer or Chemical Hygiene Chair).

6.8 (SOP) Safe Handling of Compressed Gases

EHS laboratory employees frequently handle compressed gases, thus increasing the risk of exposure to accidents. The following SOPs outline safe handling practices for compressed gases. Refer to the Compressed Gas Association (CGA) Manual, Safe Handling of Compressed Gases in Containers, Document No. CGA P-1, 1984 for more detailed information.

6.8.1 General

- Do not use compressed gas containers as rollers, supports, or for purposes other than containing the gas as labelled.
- The contents of compressed gas containers should be clearly identified as prescribed by the Department of Transportation (DOT) with the proper DOT label or alternative marking required for the compressed gas containers.
- Minimally, containers must have a label or marking identifying the contents by chemical name or commercially accepted name.
- Compressed gas containers must not contain gases capable of chemically combining with each other or with the container material.
- Do not transfer compressed gases from one container to another.
- Tampering with pressure relief devices is prohibited and container valves should not be altered or repaired except by the supplier.
- Compressed gas containers should be used and handled only by properly trained personnel.

6.8.2 Maintenance

- At no time should compressed gas containers be painted by laboratory personnel (only by the supplier).
- The supplier of the compressed gas should be notified under any of the following conditions:
 - The entry of a harmful foreign substance into the container or valve

- The container leaks or becomes defective
- The container is exposed to fire
- Containers or valves become severely corroded
- Any damage that may impair the safety of the container

6.8.3 Leaking Containers

- If a compressed gas container shows any sign of leakage, take the following steps:
 1. Activate the facility Emergency Response Plan (see Section 9.1).
 2. Notify the gas supplier.
- If there is any doubt about handling a leaking container or valve, contact the supplier or manufacturer immediately.

6.8.4 Use and Storage

- Use designated carts equipped with retaining straps and/or chains to move cylinders.
- Keep removable caps and plugs on compressed gas containers at all times, except when connected to dispensing equipment.
- Keep compressed gas container valves closed at all times except, when in use.
- Do *not* place containers in any area where:
 - They may become part of an electrical circuit
 - They are subject to temperatures above 125 °F (51.7 °C) or in contact with a flame.
 - They are subject to low temperatures extreme (unless approved by the supplier).
- Group compressed gas containers by type of gas contained.
- Store full and empty gas containers separately in a dry, well-ventilated area.
- Secure all cylinders in place using chains, cages, straps, or other restraining devices.
- Do not store compressed gas containers near readily ignitable substances or near combustibles in bulk.

6.8.5 Use of Cryogenics

- Cryogenic containers shall be clean and made from materials suitable for cryogenic

temperatures (austenitic stainless steels, copper, etc.). Use non-pressurized Dewar containers, pressurized liquid cylinders or other approved containers for cryogenic storage.

- Wear a safety shield, chemical apron, and loose fitting thermal gloves when transferring liquid nitrogen from cylinders into approved containers. Use loose-fitting thermal gloves to handle super cooled materials.
- Slowly transfer cryogens into containers to avoid thermal shock and excessive pressure build-up.
- Do not allow ice to accumulate in the Dewar neck or cover as this may cause a pressure build-up.

7.0 Laboratory Design

EHS laboratory facilities can be located in a stand-alone structure (e.g., portable building) or as part of an office in an offsite building. Regardless of the location they are to be designed so as to maximize safety. The following SOPs, on testing and maintenance of general ventilation systems and access and security, address primary issues of facility design.

7.1 General Laboratory Ventilation

Depending on the analytical procedure Field Laboratories will most likely be equipped with some form of portable stationary or fixed ventilation system. The use of ventilation systems must be approved by the Field Safety Officer or a representative from the Occupational Safety and Health Unit. The primary purpose for these ventilation systems is to protect personnel from hazardous substances which may be released into the workroom. The Field Safety Officer or an OSH representative will work with the lead chemist and the project manager to establish a qualitative and quantitative evaluation program for the ventilation system.

7.1.1 Filters

- Where applicable, in-line exhaust charcoal and HEPA filters shall be monitored to assure filter efficiency and check for contaminant build-up.
- Where utilized charcoal and HEPA filters shall be periodically monitored and maintained.
- Personnel making these inspections or performing maintenance must wear the appropriate protective clothing.
- Dispose of filters as hazardous material.

7.2 (SOP) Access and Security

7.2.1 Access

- Do not use stairways and hallways as storage areas.
- Never block access to exits, emergency equipment, and utility controls.

7.2.2 Security

- Wear your identification badge.
- Always lock laboratories during non-operational hours.

7.2.3 Visitors and Contractors

- Visitors to laboratory facilities shall observe Arthur D. Little, Inc. corporate policies and the site-specific health and safety plan for visitors and contractors.
- All visitors must sign in with the site supervisor/project manager.
- Visitors must wear appropriate PPE in laboratory areas.
- Visitors must be escorted at all times.

8.0 Waste Management

The aim of the waste management program is to assure that minimal harm to people, other organisms, and the environment results from the disposal of waste laboratory chemicals. Handle, store, transport, and dispose of laboratory wastes in accordance with all applicable Arthur D. Little policies and procedures, local, state, and federal regulations, including those of the Department of Transportation (DOT) and the Environmental Protection Agency (EPA).

Contact Rich Morrill Corporate Safety and Health Advisor, at extension 6310, with any suggestions regarding the packaging and transportation of hazardous waste.

The following SOPs provide guidance in waste handling for laboratory employees.

8.1 (SOP) Non-Chemical Waste Handling

- Place nonchemical wastes (e.g. paper, etc.) in trash receptacles only after ensuring that such wastes are free of residues of hazardous chemicals.
- Dispose of wastes contaminated with residues as hazardous waste.
- Hazardous waste shall be separated, to the extent practicable, according to the chemical classes and potential hazard (i.e., a waste code).
- Do not dispose of broken glass in trash receptacles. Dispose of it in a secure container marked "Broken Glass" to prevent worker injury.
- Never mix non-hazardous and hazardous substances. If this occurs, these mixtures must be treated as hazardous waste.

8.2 (SOP) Hazardous Waste Storage and Monitoring

- Store hazardous waste in a closed, suitably labeled, impervious container.
- Hazardous waste labels are required on each waste container. The labels must be legibly written and include the name or unit number of the individual generating the waste, the accumulation start date, the date the container is full, and the chemical contents of the container.

8.2.1 Satellite Waste Accumulation Areas

- Satellite waste accumulation areas are to be set up in each waste-producing laboratory. Each area is to be set-up and maintained by the lead chemist with assistance from Rich Morrill.

- Container(s) is (are) to be placed in each laboratory area based on the waste(s) generated by the laboratory. Various sizes and types of waste containers are available.
- Always segregate halogenated and non-halogenated wastes.
- Do not mix hazardous and non-hazardous wastes. Such a mixture will have to be regulated as a hazardous waste, thus increasing the cost and responsibility associated with the waste.
- If you see that you are going to generate and store hazardous waste at a field location contact Rich Morrill (X6310) in advance of project initiation for guidance.

8.3 (SOP) Waste Disposal

8.3.1 Methods

- All disposal of ADL generated hazardous waste is to be coordinated through Rich Morrill at extension 6310.

8.3.2 Removal

- To have hazardous waste removed from a laboratory, call Rich Morrill at extension 6310.
- Provide a waste profile identifying the chemical components and concentrations of the waste. One copy of this profile is left with the person authorizing the removal.
- Rich Morrill will coordinate the removal of waste from the premises by a qualified contractor.
- Unlabeled containers of chemicals and solutions shall be promptly labeled as best as possible, and scheduled for proper disposal.

8.3.3 Federal and State Requirements

- Arthur D. Little, Inc. is registered with the EPA as generator. Field generation of hazardous waste must be cleared through Rich Morrill prior to project initiation. He will obtain an appropriate generator number for the field activity.

9.0 Emergency/Contingency Planning

Laboratory employees must be trained and prepared to respond to several types of emergencies commonly encountered in the laboratory environment. These emergencies may include:

- Small spills of hazardous chemicals
- Accidents and injuries, especially those which may result in exposure to hazardous chemicals
- Fires

Responses to these emergencies may include:

- Evacuation
- Minor spill cleanup
- First aid/CPR
- Fire-fighting (incipient only using portable fire extinguishers)
- The project-specific health and safety plan will describe the specific emergency response plan for the site.

In addition, the following SOPs describe general emergency response practices, and outline EHS policy on emergency response issues.

9.1 Emergency Response and Evacuation Procedures

9.1.1 Introduction

All personnel must know how, and to whom, to report an emergency. Each person must also be familiar with the escape routes and the location and operation of fire extinguishers, showers, and other emergency equipment. This information will be located in the site-specific health and safety plan and be communicated during site safety briefings/meetings.

9.1.2 Reporting an Emergency

Follow the emergency reporting procedure outlined in the site-specific health and safety plan.

9.1.3 Evacuating the building

If necessary, immediately evacuate the lab and proceed to the pre-established meeting point. When evacuation of a building is required, it is important that personnel be accounted for and that injured or missing individuals be reported to emergency personnel as soon as possible.

Do not re-enter the lab until directed to do so by designated emergency personnel.

9.2 Emergency Medical Response

9.2.1 Definition

- A medical emergency is a medical condition which requires immediate professional medical attention.
- This includes any incident which results in loss of consciousness, and which could result from exposure to hazardous material.
- Such situations are best handled in a hospital emergency room.

9.2.2 Procedures

When a medical emergency occurs, the employee involved, or the person discovering the situation, should immediately:

1. Call for help to bring others in the immediate area for assistance.
2. If qualified in first aid/CPR and bloodborne pathogens, secure necessary equipment and render first aid. Call the emergency number indicated in the site-specific health and safety plan.
 - Give the exact location of the emergency, the nature of the emergency, and the name and condition of the employee(s) involved.
 - Do not hang up before the emergency center does. This ensures that the emergency center has whatever information is needed to effectively respond.
3. Stay with the victim and provide support, as required. If an exposure to toxic materials has taken place, obtain information about the health and safety procedures specific for that chemical. Obtain this information from the MSDS, the lead chemist, the Field Safety Officer or the Corporate Safety and Health Advisor.
4. Give all pertinent information to the responding medical personnel. If the victim was exposed to hazardous materials, give the emergency personnel as much information as possible about the toxicity and nature of the material to which the person has been exposed. Provide chemical identity and hazard information, regardless of any client confidentiality agreements.
5. Notify the program, project, and laboratory management and chemical hygiene chairperson as soon as possible.
6. The employee reporting the emergency must fill out an accident report form, Figure 11, and provide all necessary information to management about the incident within 24 hours so that appropriate accident reports can be completed.

Complete this accident form whenever there is an injury and submit to the CHC within 24 hours of incident.

Name of Injured Person: _____

Unit #: _____

Employee #: _____

Date of Incident: _____

Did you receive medical attention? _____

Treatment received: _____

Is follow-up required? _____

Description of incident and resulting injury: _____

Do you think something could have been done to prevent this accident from occurring? If yes, what? _____

Signature: _____

Date: _____

Figure 11 Accident Report Form

9.3(SOP) Accidents and Injuries

9.3.1 Response

- Immediately report all accidents and injuries, especially those resulting in exposure to hazardous chemicals, to the Medical Center (extension 5100).

9.3.2 Treatment

- It is the duty of each employee to see that he or she receives proper first aid treatment for all minor injuries at once.
- The health and safety plan will identify the designated facility which will provide medical assistance.

9.3.3 Reporting

- Report every injury, no matter how slight, at once to the site/project manager.
- Report the following incidents using EHS's incident report form (Figure 11):
 - Every accident (with or without injury).
 - Accidents resulting in damage to instruments, property, or the building.
 - Situations or conditions which have the potential for injury, hazard to health, or damage to the property.
- Complete this report (Figure 11) and submit a copy to the employee's project/program manager, the CHC, and the Medical Center immediately following the injury, but no later than the end of the work day or shift.
- It is the responsibility of the unit manager to ensure that required accident report forms are completed and the proper authorities and departments are notified.

9.3.4 Emergency Numbers

- The site specific health and safety plan will include emergency telephone numbers. These numbers will also be posted at all telephones.

9.3.5 Laboratory Explosion/Violent Reaction

Take the following steps when a laboratory employee is involved with a chemical reaction that is unexpectedly continuing in a violent manner, or terminates in explosion or fire.

- Immediately evacuate the immediate area.
- Contact the site supervisor.
- If it is possible, without jeopardizing your safety, remove the energy source, i.e.,

- Electricity
- Flame
- Steam
- Gas cylinder
- Combustible reactions, or those generating heat or pressure, should always be performed in a chemical fume hood. When the reaction appears to be "out of control," immediately pull the hood sash closed.
- Activate the site emergency response system.

9.4 First Aid for Chemical Exposures

9.4.1 Coverage

- First aid recommendations contained in most chemical handling documents (such as MSDSs) assume that a physician, ambulance or emergency medical service is available within 5 to 15 minutes. They reflect a non-hospital situation and are thus designed to cover only that initial period while awaiting professional help. Immediately call the emergency phone number, identified in the site-specific health and safety plan to bring medical personnel to the victim.
- Only provide first aid/CPR if you are trained and qualified. At least two ADL personnel are to be trained in first aid/CPR/bloodborne pathogens at each site. Bloodborne pathogens/first aid kits are also to be located at each worksite (activity) at a site.

9.4.2 Effects to Nervous System

If the victim is convulsing or unconscious:

- Do not induce vomiting, (inducing vomiting in an unconscious person is likely to aspirate the chemical into the lungs, causing dispersion and other complications.)
- Ensure that the victim's airway is open and lay the victim on his/her side with the head lower than the body.
- Immediately transport the victim to a hospital.

9.4.3 Ingestion

If the chemical ingested is:

An irritant, corrosive or volatile

- Do not induce vomiting, (Inducing vomiting with these types of chemicals is likely to aspirate the chemical into the lungs and may harm or destroy other tissues in the throat or mouth.)
- It is usually best to dilute the chemical with 1 or 2 glasses of water until the person is under the care of a physician or paramedic.
- If the chemical is very toxic, then the victim may be advised to drink a slurry of activated charcoal to adsorb the chemical while awaiting medical help.

Not an irritant, corrosive, or volatile, but is very toxic (i.e., the quantity sufficient to induce death is about 1 teaspoon or less): consider the risk of inducing vomiting because of the high toxicity of the chemical.

- Ipecac syrup or salt water may be used in such an emergency.

Not an irritant, corrosive, or volatile, and has low toxicity (the situation which covers the majority of organic and inorganic compounds), give 1 or 2 glasses of water to dilute the chemical, while awaiting medical help.

9.5(SOP) General Spill Response

9.5.1 General

- All spills constitute a hazard.
- Responses to incidental releases of hazardous substances where the substances can be quickly absorbed, neutralized, or otherwise controlled at the time of release by employees in the immediate release area, or by maintenance personnel, are **not** considered emergency responses. Small spill cleanup kits are to be located in each laboratory.
- Whenever qualified personnel from outside the immediate release area of a chemical spill are summoned to assist (e.g., the fire department), the response is considered an "emergency".
- If an "emergency" occurs, affected employees shall evacuate the workplace and shall not be permitted to assist in handling the emergency.
- The primary consideration during any hazardous spill response is to avoid employee exposure and to prevent ignition of flammable material. Secondary considerations include preventing material from going down a drain or sewer, minimizing property damage, and reducing downtime.
- Arthur D. Little, Inc. laboratory employees are not trained to clean up spills of hazardous materials. An outside contractor will be called in to clean up hazardous materials beyond an "incidental release".

- Follow the guidance contained in the site-specific health and safety plan with regard to contacting outside spill response services.

9.5.2 Definitions

Hazardous material: Any material that:

- Can cause personal injury or illness
- Can cause environmental damage
- Has unknown effects

Nonhazardous material: Only those materials that can be handled without special precautions.

Qualified Personnel: The fire department; members of the fire department's HAZMAT team; qualified commercial contractors.

Spill Kit: A located near hazardous material transfer, disposal or storage areas where supplies are kept for emergency use to reduce the likelihood of hazards associated with hazardous material spills. The station includes chemical absorbent and neutralization materials, warning signs, disposal bags, and protective equipment.

9.5.3 Initial Procedures for Spill Response

1. Avoid personal exposure to the substance.

Do not walk into or touch any spilled material.

Avoid breathing any gases, vapors, fumes, or smoke.

If the substance is unknown, leave the area.

Do not assume that a hazardous material is harmless just because it does not have an odor.

2. Containing small spill

Use absorbent material from the spill cleanup kit to keep the hazardous material from spreading and prevent it from entering any sewer or drain.

If possible, without risking personal contamination, shut off the source of the spill.

Do not attempt to turn off power inside the affected area because this action may cause a spark and possibly ignite a flammable material.

3. Identify the material as soon as possible without risking personal exposure. If the exact name of the substance is not available, obtain the class (i.e. flammable, chlorinated, acidic, etc.) of the material.

Check the MSDS for hazard data as well as special protection information and handling precautions.

If the material cannot be identified as hazardous or nonhazardous, it must be treated as hazardous.

If necessary, contact outside expertise (e.g., CHEMTREC, manufacturer) for identification and/or additional chemical information.

4. Decision to clean the spill or to obtain help

- The spill may be cleaned up yourself, if all of the following conditions are met:
 - The identity of the spilled material is known,
 - The associated hazards are known and they do not pose a threat to your health or safety,
 - Only a small amount (< 0.5 liter) of material has been spilled,
 - Personnel can clean up the spill without exposing themselves and others in the vicinity to undue risk, and
 - The procedures do not require special equipment (i.e. respirator, coated Tyvek clothing, special disposal methods)
- If not all of the conditions are met, proceed to step 5 below.
- If at any point the cleanup task is more than initially anticipated or if it is felt that the situation may now present a possible threat to your health or safety or to any person in the vicinity, leave the area and obtain help at once.
- After cleaning the spill, discard all contaminated materials appropriately and fill out a spill report, Figure 12. The Corporate Safety and Health Advisor, Rich Morrill (X6310), for assistance in disposal.
- Examples of spills that lab personnel may clean on their own include: 100 ml of methylene chloride in the hood or on the floor a few mls of an acid, or a base.

For more information on cleaning a spill, reference SOP 9.7.

- If you are not sure of the proper cleanup procedure or if the volume is large, proceed to step 5.

5. Obtain help.

Contact the site supervisor immediately. If the situation is an emergency, immediately call the emergency number identified in the site-specific health and safety plan.

Immediately report all spills to the laboratory management who will in turn coordinate any additional notification requirements.

Contact the medical center (extension 5100) immediately in the event of any actual or suspected injury or exposure to the hazardous material and inform medical responders of the material involved.

Report a spill of any substance that has a hazardous potential, it should be reported to the case leader, safety specialist (R. Morrill) and Safety Committee Chair-person, and the Field Safety Officer (Corey Briggs). Although no acute health effect may occur while cleanup operations are underway, submit a report form to the Chemical Hygiene Committee in order to review procedures related to the cause of the spill and to document the incident in the event of future medical implications. If doubt exists as to the hazardous potential of the spilled material, submit the report.

1. Place, date and time of incident _____
 2. Material spilled and hazard _____
 3. Quantity (concentration, volume, etc.) _____
 4. Individual(s) involved in spill _____
 5. Safety equipment used (respirator device, gloves, etc.) _____

 6. Personnel involved in cleanup _____
 7. Material used in cleanup _____
 8. Disposal procedure _____
 9. Personnel showing ill effect (if any) _____
 10. Was injury report submitted _____
- Signature of Submitter: _____ Date: _____
- Case Leader: _____ Date: _____
- Chemical Hygiene Member: _____ Date: _____

Figure 12 Hazardous Material Spill Report

6. Isolate the hazard area and deny entry.

Without entering the immediate hazard area, move and keep people away from the spill.

If the material is a gas or volatile liquid, evacuate the surrounding areas.

In the surrounding area, post warning signs that are available from the spill cleanup station.

Only qualified personnel with the proper protective equipment and clothing will be allowed in the spill area.

7. Do not attempt clean-up until further direction is given from qualified personnel.

9.6(SOP) Spills Involving Contamination of Personnel

If any chemical comes into contact with your skin:

- Discard any protective clothing that has been contaminated.
- Wash thoroughly, using the eyewash and/or shower as necessary (minimum 5-minute flush).
- Call for help as soon as possible.
- Contact the emergency medical provider identified in the site-specific health and safety plan.
- If needed notify the medical center (extension 498) and follow all recommendations
- Fill out an accident report form (Figure 11).

9.7(SOP) Procedures for Spill Cleanup

- Project management is ultimately responsible for ensuring that the cleanup is performed in a safe and environmentally sound manner.
- If evacuation of the area is necessary, follow the procedures listed in SOP 9.1.
- Wear appropriate protective personal equipment for protection during cleanup procedures.
- If possible, have an appropriately dressed coworker help with the cleanup.

9.7.1 Use of Spill Control Pillows/Pads/Socks

- Chemical spill control absorbents contain a highly absorptive inert material that allows the flow of fluids into the absorbent. The fluids will be retained by the absorbent, making it possible to contain the majority of the spill within the bag for easy disposal. Once deployed, let the absorbent sit in the material for a while.
- Use pillow on only one spill. Do not attempt to reuse pillows or dry out the pillow after use. Residues may remain that could react with other chemicals.

WARNING - spill control pillows do not contain any chemical designed to make liquids less toxic or flammable. Exercise extreme care when handling, storing, or disposing of spill control pillows containing absorbed material. *Do not use chemical spill pillows on hydrofluoric acid spills.*

9.7.2 Solvent Spills

1. Select a solvent spill kit. Apply sufficient absorbent (e.g., spill pad, pillow, solusorb from JT Baker) on the spill to absorb all of the solvent.
2. Thoroughly mix the absorbent and solvent with the scoops provided until the absorbent regains its appearance as a dry, free-running, non-adhering granular material. *Note: If the proper quantity of absorbent is used, the solvent odor in the mixture will be very slight. If a strong odor persists, add additional absorbent.*
3. Pick up the saturated absorbent with the scoops provided and transfer it to the plastic disposal bag provided. Place the used scoops and gloves in the disposal bag and twist seal with the bag tie provided.
4. Fill out the disposal label, peel off the backing, and affix the label to the bag.
5. Dispose the bag appropriately. If you have any questions, consult a laboratory manager, member of the CSC, the Corporate Safety and Health Advisor, R. Morrill, or the Field Safety Officer, C. Briggs.

9.7.3 Acid Spills

1. Select an acid spill kit. Apply the acid neutralizer (e.g., Neutrasorb acid neutralizer from JT Baker) to the spill from the perimeter inward, applying sufficient neutralizer to obtain a uniform color change throughout.
2. Note the color of the slurry.

Color Code: Red/Pink - (Highly Acidic) HAZARDOUS
Yellow-Buffer - (Slightly Acidic) HAZARDOUS
Blue/Green - (Safe)

If the slurry color indicates an acidic condition (may be encountered in spills of concentrated acids), carefully add water and additional Neutrasorb. Mix thoroughly with the plastic scoops provided until a persistent blue/green color appears. Do not proceed until foaming has ceased.

3. Pick up the neutralized spill material with the scoops and transfer to the plastic disposal bag provided. Wipe up any residual neutralized spill material with the sponge (moistened) provided. You may wish to pH the spill area after cleanup.
4. Place used sponge, scoops, and gloves in the disposal bag and twist seal with the bag tie provided. Fill out the disposal label, peel off backing and affix to the bag.
5. Contact the Corporate Health and Safety Advisor, R. Morrill, for assistance with disposal.

9.7.4 Caustic Spills (e.g. sodium hydroxide, ammonia)

1. Select a caustic spill kit. Apply the caustic neutralizer (e.g., Neutrakit-2 from JT Baker) to the caustic spill from its perimeter inward and completely absorb the spill. A color change from yellow to blue signifies caustic material (HAZARDOUS).

Note: If absorption is slow or spill material is concentrated (40% greater) add additional cool tap water to aid absorption and color reaction.

2. Thoroughly mix the slurry with the scoops provided until it changes to a yellow/yellow-green color (neutralized). Add additional Neutrakit 2 and/or water if necessary to obtain the above color reaction and desired slurry consistency.
Note: This step will be accompanied by slow boiling if concentrated caustic solutions are treated. Observe appropriate precautions when handling hot materials.
3. Pick up the neutralized material with the scoops provided and transfer it to the plastic disposal bag provided. Place the used scoops and gloves in the disposal bag and twist seal with the bag tie provided. You may wish to pH the area after cleanup.
4. Fill out the disposal label, peel off the backing, and affix the label to the bag.
5. Contact the Corporate Safety and Health Advisor, R. Morrill, for assistance with disposal.

9.7.5 Mercury Spills

1. Select a mercury spill kit.
2. Wear plastic shoe covers if mercury has been spilled on the floor.
3. Do not place elemental mercury waste in drains.
4. Transfer the mercury to the disposal bag. Place the used scoops and gloves in the disposal bag and twist seal with the bag tie provided.

5. Fill out the disposal label, peel off the backing, and affix the label to the bag.
6. Thoroughly wash hands, arms, and face after cleanup is complete.
7. Contact the Corporate Safety and Health Advisor, R. Morrill, for assistance with disposal.

9.7.6 Incidental Liquid Spills (1 liter or less of non-highly toxic chemicals):

1. Use spill control pillows to absorb the spill onto absorbent material. If the material is an acid or base, use the appropriate neutralizing agent to neutralize the substance.
2. Consult the MSDS for the chemical for specific cleanup and disposal techniques.
3. If the spilled material is hazardous, dispose of absorbed material as hazardous waste.
4. Clean the affected area with soap and water.

9.7.7 Incidental Solid Spills

1. Do not dry sweep.
2. Cover the solid material with wet paper towels (using water or appropriate, compatible solvent, scoops, and gloves). Avoid spreading the compound as much as possible. Carefully pick up the material.
3. Consult the MSDS for the chemical for more specific cleanup and disposal techniques.
4. If the spilled material is hazardous, dispose of absorbed material as hazardous waste.
5. Clean the affected area with soap and water.

9.7.8 Recordkeeping

Fill out a spill report (Figure 12) for each spill before the end of the day. Submit a copy of the form to the program/project manager CHC, the unit manager, the Corporate Safety and Health Advisor, and the Field Safety Officer.

APPENDIX A

Appendix A: Glossary

Action Level

A level of contaminant concentration that is below the *PEL, but above the level at which OSHA requires additional sampling or other action, such as medical surveillance. Usually, Action Levels are one-half the PEL for a given substance.

Acute effect

An adverse effect on a human or animal body, with severe symptoms developing rapidly and coming quickly to a crisis

Acute toxicity

The adverse effects resulting from a single dose or exposure to a substance.

Asphyxiant

A chemical that either displaces oxygen in the air, or prevents bodily absorption of oxygen, to cause suffocation.

Boiling Point

The temperature at which a liquid changes to a vapor state at a given pressure. Flammable materials with low boiling points generally present special fire hazards.

Breakthrough

Breakthrough time is the elapsed time between the initial contact of a chemical with the outside of CPC and the time at which the chemical is first detected on the inside surface of the material by means of the chosen analytical instrument.

"C" or ceiling

The maximum allowable human exposure limit for an airborne substance; not to be exceeded even momentarily (see also TLV).

Carcinogen

A substance or agent capable of causing or producing cancer in mammals. A carcinogen is defined as any substance which meets one of the following criteria:

- Regulated by OSHA as a carcinogen
- Listed as a carcinogen or potential carcinogen in the NTP Annual Report on Carcinogens
- Evaluated by IARC and found to be a carcinogen or potential carcinogen.

C.A.S.

Chemical Abstracts Service; A Columbus, Ohio organization which indexes information published in "Chemical Abstracts" by the American Chemical Society and provides index guides by which information about particular substances may be located in the "Abstracts" when needed. "C.A.S. Numbers" identify specific chemicals.

cc

Cubic centimeter; a volume measurement in the metric system, equal in capacity to one milliliter (ml). One quart is about 946 cubic centimeters.

CFR

Code of Federal Regulations; a compilation of all current regulations and standards published by the Office of the Federal Register.

CFR 40

Code of Federal Regulations, Title 40: governs treatment, storage, and disposal of hazardous waste.

CFR 49

Code of Federal Regulations, Title 49: governs hazardous material (includes waste) transportation.

CGI

Combustible Gas Indicator.

Chemical Family

A group of single elements or compounds with a common general name. Example: acetone, methyl ethyl ketone, and methyl isobutyl ketone are of the "ketone" family.

Chemical Hygiene Officer

An employee who is designated by the employer, and who is qualified by training or experience to provide technical guidance in the development and implementation of the provisions of the Chemical Hygiene Plan. This definition is not intended to place limitations on the position description or job classification that the designated individual shall hold within the employer's organization structure.

CHEMTREC

Chemical Transportation Emergency Center; a national center established by the Chemical Manufacturers Association (CMA) in Washington, D.C. in 1970, to relay pertinent emergency information concerning specific chemicals on request. CHEMTREC has a 24-hour toll free telephone number (800-424-9300), intended primarily for use by those who respond to chemical transportation emergencies.

Chronic effect

An adverse effect on a human or animal body, with symptoms which develop slowly over a relatively prolonged period of time.

Chronic toxicity

Adverse effects resulting from repeated doses of or exposures to a substance over a relatively prolonged period of time.

CIH

Certified Industrial Hygienist.

CMA

Chemical Manufacturer's Association.

Combustible liquids

Any liquid having a flashpoint at or above 100°F (37.8 C) , but below 200°F (93.3°C), except any mixture having components with flashpoints of 200°F (93.3°C), or higher, the total volume of which make up 99% or more of the total volume of the mixture.

Combustible liquids do not ignite as easily as flammable liquids, but can be ignited under certain circumstances, and must be handled with caution.

Compressed gas

- A gas, or mixture of gases, having, in a container, an absolute pressure that exceeds 40 psi at 70°F (21.1°C),
- A gas, or a mixture of gases, having, in a container, an absolute pressure that exceeds 104 psi at 130°F (54.4°C), regardless of the pressure at 70°F (21.1°C), or
- A liquid having a vapor pressure that exceeds 40 psi at 100°F (37.8°C)

Concentration

The **relative** amount of a substance when combined or mixed with other substances.

Corrosive

A liquid or solid that causes visible destruction or irreversible alterations in human skin tissue at the site of contact or, in the case of liquid from its package, a liquid that has a severe corrosion rate on steel.

CPC or chemical protective clothing

An item of clothing used to isolate parts of the body from direct contact with a potentially hazardous chemical.

Cutaneous toxicity

See "Dermal toxicity."

Decomposition

Breakdown of a material or substance (by heat, chemical reaction, electrolyses, decay, or other processes) into parts or elements of simpler compounds.

Dermal

Used or applied to the skin

Dermal Toxicity

Adverse effects resulting from skin exposure to a substance.

Designated area

An area which may be used for work with "select carcinogens," reproductive toxins or substances which have a high degree or acute toxicity. A designated area may be the entire laboratory, an area of a laboratory, or a device such as a laboratory hood.

DOL

U.S. Department of Labor; includes the Occupational Safety and Health Administration (OSHA)

Emergency

Any occurrence, such as, but not limited to, equipment failure, rupture of containers, or failure of control equipment which results in an uncontrolled release of a hazardous chemical into the workplace.

EPA

U.S. Environmental Protection Agency; Federal agency with environmental protection regulatory and enforcement authority. Administers Clean Air Act, Clean Water Act, FFRA, RCRA, TSCA, other Federal environmental laws.

Evaporation Rate

The rate at which a particular material will vaporize (evaporate) when compared to the rate or vaporization of a known material. the evaporation rate can be useful in evaluating the health and fire hazards of a material. The known material is usually normal butyl acetate, with a vaporization rate designated as 1.0. Vaporization rates or other solvents or materials are then classified as "fast evaporating" (greater than 3.0), "medium evaporating" (0.8-3.0), or "slow evaporating (less than 0.8).

Explosive

Used to describe a chemical that causes a sudden, almost instantaneous release of pressure, gas, and heat, when subjected to sudden shock, pressure, or high temperature.

Flammable Aerosol

An aerosol that , when tested by the method described in 16 CFR 1500.45, yields a flame projection exceeding 18 inches at full-valve opening, or a flashback (a flame extending back to the valve) at any degree of valve opening.

Flammable gas

- A gas that, at ambient temperature and pressure, forms a flammable mixture with air at a concentration of 13% by volume or less; or
- A gas that, at ambient temperatures and pressure, forms a range of flammable mixtures with air wider than 12% by volume, regardless of the lower limit.

Flammable liquid

Any liquid having a flashpoint below 100°F (37.8°C), except any mixture having components with flashpoints of 100°F (37.8°C) or higher, the total of which makes up 99% or more of the total volume of the mixture.

Flammable solid

A solid, other than a blasting agent or explosive, that is liable to cause fire through friction, absorption of moisture, spontaneous chemical changes, or retained heat from manufacturing or processing, or that can be ignited readily and, when ignited, burns so vigorously and persistently as to create a serious hazard.

Flash Point

The minimum temperature at which a liquid gives off vapor within a test vessel in sufficient concentration to form an ignitable mixture with air near the surface of the liquid. There are several flash point test methods, and flash points may vary for the same material depending on the method used, so the test method is indicated when the flash points is given.

Fume

Airborne particulate formed by the vaporization of solid materials; usually refers to metals. Fume particles are usually less than one micron in diameter.

Gas

A state of matter in which the material has very low density and viscosity, diffuses easily into other gases, and is readily redistributed throughout any container. Examples of atmospheric gases include oxygen, nitrogen, and carbon dioxide.

General Exhaust

A system for exhausting air containing contaminants from a general work area.

Generic material

Made from one type of polymer or polymer combination. Examples are neoprene, nitrile, and polyvinyl alcohol. When products are manufactured from the polymer, additions of other materials are included for various reasons during the manufacturing process.

Hazardous Chemical

A chemical for which there is statistically significant evidence based on at least one study conducted in accordance with established scientific principles that acute or chronic health effects may occur in exposed employees.

Health Hazard

Includes chemicals which are carcinogens, toxic or highly toxic agents, reproductive toxins, irritants, corrosives, sensitizers, hepatotoxins, nephrotoxins, neurotoxins, agents which act on the hematopoietic systems, and agents which damage the lungs, skin, eyes, or mucous membranes,

IARC

International Agency for Research on Cancer.

Incompatible

Used to describe materials that could cause dangerous reactions from direct contact with one another.

Ingestion

The taking in of a substance through the mouth.

Inhalation

The breathing in of a substance in the form of a gas, vapor, fume, mist, or dust.

Inhibitor

A chemical that is added to another substance to prevent an unwanted chemical change from occurring.

Irritant

A substance, which is not a corrosive, but which causes a reversible inflammatory effect on living tissue by chemical action at the sight of contact.

Lower Explosive/Flammable Limit (LEL/LFL)

The lowest concentration of a vapor or gas which will explode, ignite, or burn in the presence of an ignition source. Mixtures below this limit are too lean to burn. LELs are expressed in percent vapor or gas in air by volume; one percent equals 10,000 ppm.

Melting Point

The temperature at which a solid substance changes to a liquid state. For mixtures, the melting range may be given.

Mists

Aerosolized liquid droplets generated wither by condensation of gases to liquids, or by fine dispersion of a liquid through splashing or atomizing.

Mutagen

Any substance that can cause a change (mutation) in the genetic material of a living cell. All carcinogens are mutagens.

NFPA

National Fire Protection Association; an international voluntary membership organization to promote/improve fire protection and prevention and establish safeguards against loss of life and property by fire. Best known on the industrial scene for the National Fire Codes - 16 volumes of codes, standards, recommended practices, and manuals developed (and periodically updated) by NFPA technical committees. Among these is NFPA 704M, the code for showing hazards of materials using the familiar diamond-shaped label or placard with appropriate numbers or symbols.

NIOSH

National Institute for Occupational Safety and Health of the Public Health Service, U.S. Department of Health and Human Services (DHHS); Federal agency which - among other activities - tests and certifies respiratory protective devices, recommends occupational exposure limits for various substances and assists OSHA and MSHA in occupational safety and health investigations and research.

NTP

National Toxicology Program.

Oral

Used in or taken into the body through the mouth or intragastrically.

Oral Toxicity

Adverse effects resulting from taking a substance into the body via the mouth.

Organic Peroxide

An organic oxidizer that can be shock and heat sensitive, flammable, and potentially explosive. An organic compound that contains the bivalent —O—O— structure, and which may be considered to be a structural derivative of hydrogen peroxide where one or both of the hydrogen atoms has been replaced by an organic radical group.

OSHA

Occupational Safety and Health Administration of the U.S. Department of Labor-, Federal agency with safety and health regulatory and enforcement authorities for most U.S. industry and business. Also see "MSHA".

Oxidation

A reaction in which a substance combines with oxygen provided by an oxidizer or an oxidizing agent.

Oxidizer

A chemical other than a blasting agent or explosive, that initiates or promotes combustion in other materials thereby causing fire either of itself or through the release of oxygen or other gases.

Particularly Hazardous Substances

These include "select carcinogens," reproductive toxins and substances which have a high degree of acute toxicity.

Penetration

The flow of a chemical through closures, porous materials, seams, pinholes, or other imperfections in a protective clothing material on a non-molecular level.

Percent Volatile

The percentage of a liquid or solid (by volume) that will evaporate at an ambient temperature of 70°F. (Unless some other temperature is stated).

Permeation

The process by which a chemical moves through protective clothing on a molecular level. It involves sorption of the chemical into the contacted material, diffusion of the chemical molecules in the material, and desorption from the opposite surface of the material.

Permissible Exposure Limits (PELS)

Limits developed by OSHA to indicate the maximum airborne concentration of a contaminant to which an employee may be exposed over the duration specified by the type of PEL assigned to that contaminant.

Persistent Chemicals

Substances which resist biodegradation and/or chemical oxidation when released into the environment and tends to accumulate on land, in air, in water, or in organic matter.

Physical Hazard

A chemical for which there is scientifically valid evidence that is a combustible liquid, a compressed gas, explosive, flammable, an organic peroxide, an oxidizer, pyrophoric, unstable, or water-reactive.

Polymerization

A chemical reaction in which one or more small molecules combine to form larger molecules. A hazardous polymerization is such a reaction which takes place at a rate which releases large amounts of energy. If hazardous polymerization can occur with a given material, the MSDS usually will list conditions which could start the reaction.

Pyrophoric

A chemical that ignites spontaneously in air at a temperature of 130°F (54.4°C) or below.

RCRA

Resource Conservation and Recovery Act; Federal environmental legislations, administered by EPA, aimed at controlling the generation, treating, storage, transportation, and disposal of hazardous wastes. (Cradle to grave); CFR 40.

Reaction

A chemical transformation or change; the interaction of two or more substances to form new substances.

Reactive

See "Unstable".

Reducing Agent

In a reduction reaction (which always occurs simultaneously with an oxidation reaction) the reducing agent is the chemical or substance which combines with oxygen, or loses electrons to the reaction.

Reproductive Toxins

Chemicals which affect the reproductive capabilities including chromosomal damage (mutagens) and effects on fetuses (teratogens).

Sensitizer

A substance which on first exposure causes little or no reaction in man or test animals, but which on repeated exposure may cause a marked response not necessarily limited to the contact site. Skin sensitization is the most common form of sensitization in the industrial setting, although respiratory sensitization to a few chemicals is also known to occur.

"Skin"

A notation, sometimes used with PEL or TLV exposure data; indicated that the stated substance may be absorbed by the skin, mucous membranes, and eyes, either airborne or by direct contact, and that this additional exposure must be considered part of the total exposure to avoid exceeding the PEL or TLV for that substance

Solubility in Water

A term expressing the percentage or a material (by weight) that will dissolve in water at ambient temperature.

Species

A biological type; on MSDS'S, species refers to the test animals (usually rats, mice, or rabbits), which were used to obtain the toxicity test data reported.

Specific Gravity

The weight of a material compared to the weight of an equal volume of water; an expression of the density (or heaviness) of the material.

Stability

An expression of the ability of a material to remain unchanged. For MSDS purposes, a material is stable if it remains in the same form under expected and reasonable conditions of storage or use. Conditions which may cause instability (dangerous change) are stated -- examples, temperatures above 150°F, shock from dropping.

Steady state permeation

The constant rate of permeation that occurs after the breakthrough when all forces affecting permeation have reached equilibrium.

Teratogen

A substance or agent to which exposure of a pregnant female can result in malformations in the fetus.

Threshold Limit Value - Time Weighted Average (TLV-TWA)

The time-weighted average airborne concentration of a contaminant to which nearly all workers may be exposed, for a normal 8-hour workday and a 40-hour workweek without adverse effect. Defined by the American Conference of Governmental Industrial Hygienists (ACGIH).

Threshold Limit Value - Short Term Exposure Limit (TLV-STEL)

The airborne concentration to which workers can be exposed for a short period of time without suffering from irritation, chronic or irreversible tissue damage, or narcosis of sufficient degree to increase the likelihood of accidental injury, impair self-rescue or materially reduce work efficiency (provided the daily TLV-TWA is not exceeded). A 15-minute TWA exposure should not occur more than four times per day, or occur more than once during a 60 minute period; defined by ACGIH.

Threshold Limit Value - Ceiling (TLV-C)

The airborne concentration that should not be exceeded during any part of the working exposure; may exceed the TLV-TWA as long as equivalent exposures are compensated by excursions below the TLV-TWA;

Toxicity

The sum of adverse effects resulting from exposure to a material, generally be the mouth, skin, or respiratory tract.

TSCA

Toxic Substances Control Act; Federal environmental legislation, administered by EPA, for regulating the manufacture, handling, and use of materials classified as "toxic substances". Part of RCRA.

Unstable

Describes a chemical that, in the pure state, or as produced or transported, vigorously polymerizes, decomposes, condenses, or becomes self-reactive under conditions of shock, pressure, or temperature.

Upper Explosive/Flammable Limit (UEL/UFL)

the highest concentration of a vapor or gas which will explode, ignite, or burn in the presence of an ignition source. Mixtures above this limit are too rich to burn. LELs are expressed in percent vapor or gas in air by volume; one percent equals 10,000 ppm.

Vapor

The gaseous form of materials that are normally liquids or solids at room temperature and pressure (steam).

Vapor Density

The weight of a vapor or gas compared to the weight of an equal volume of air; an expression of the density of the vapor or gas. Materials lighter than air have vapor densities less than 1.0. Materials heavier than air have vapor densities greater than 1.0. All vapors and gases will mix with air, but the lighter materials will tend to rise and dissipate (unless confined). Heavier vapors and gases are likely to concentrate in low places.

Vapor Pressure

The pressure exerted by a saturated vapor above its own liquid in a closed container.

Ventilation

See "General Exhaust."

Water Reactive

A chemical that reacts with water to release a gas that is either flammable or presents a health hazard. Usually flammable solids will react in varying degrees with water or humid air.

APPENDIX B

COMPATIBILITY CHART

X Represents unsafe combinations.

The following pages list the chemicals by chemical name and by reactivity groups. Obtain the group for the chemical and then read chart, first from left to right, then down.

Chemicals Not On Chart

Carbon Bisulfide forms an unsafe combination with reactivity groups 1, 4, 19, 20, and epichlorohydrin.

Epichlorohydrin forms an unsafe combination with reactivity groups 1, 2, 3, 4, 14, 15, 19, 20, 22, 23, 24, and carbon bisulfide.

Motor Fuel antiknock compounds form unsafe combinations with reactivity groups 1, 4, 5, 6, 7, 15, 19, and 20.

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
1 Inorganic Acids	X																							
2 Organic Acids	X	X																						
3 Caustics	X	X	X																					
4 Amines & Alkanolamines	X	X	X	X																				
5 Halogenated Compounds	X																							
6 Alcohols, Glycols & Glycol Ethers	X	X	X	X																				
7 Aldehydes	X		X	X																				
8 Ketones	X																							
9 Saturated Hydrocarbons	X																							
10 Aromatic Hydrocarbons	X					X																		
11 Olefins	X																							
12 Petroleum Oils	X																							
13 Esters	X	X	X	X		X																		
14 Monomers & Polymerizable Esters	X	X	X	X	X	X	X																	
15 Phenols	X	X	X	X	X	X	X	X																
16 Alkylene Oxides	X	X	X	X	X	X	X	X																
17 Cyanohydrins	X	X	X	X	X	X	X	X																
18 Nitriles	X	X	X	X	X	X	X	X																
19 Ammonia	X																							
20 Halogens	X	X				X	X	X																
21 Ethers	X	X	X	X																				
22 Phosphorus, Elemental	X	X	X	X																				
23 Sulfur, Molten	X																							
24 Acid Anhydrides	X																							

REACTIVITY GROUPS

GROUP 1 – INORGANIC ACIDS

chlorosulfonic acid
hydrochloric acid (aqueous)
hydrofluoric acid (aqueous)
hydrogen chloride (anhydrous)
hydrogen fluoride (anhydrous)
nitric acid
oleum
phosphoric acid
sulfuric acid

GROUP 2 – ORGANIC ACIDS

acetic acid
butyric acid (n-)
formic acid
propionic acid
rosin oil
tall oil

GROUP 3 – CAUSTICS

caustic potash solution
caustic soda solution

GROUP 4 – AMINES AND ALKANOLAMINES

aminoethylethanolamine
aniline
diethanolamine
diethylamine
diethylenetriamine
diisopropanolamine
dimethylamine
ethylenediamine
hexamethylenediamine
hexamethylenetetramine
2-methyl-5-ethyl pyridine
monoethanolamine
monoisopropanolamine
morpholine
pyridine
triethanolamine
triethylamine
triethylenetetramine
trimethylamine

GROUP 5 – HALOGENATED COMPOUNDS

allyl chloride
carbon tetrachloride

GROUP 5 – (cont'd)

chlorobenzene
chloroform
chlorohydrins, crude
dichlorobenzene (o-)
dichlorobenzene (p-)
dichlorodifluoromethane
dichloroethyl ether
dichloropropane
dichloropropene
ethyl chloride
ethylene dibromide
ethylene dichloride
methyl bromide
methyl chloride
methylene chloride
monochlorodifluoromethane
perchloroethylene
propylene dichloride
1,2,4-trichlorobenzene
1,1,1-trichloroethane
trichloroethylene
trichlorofluoromethane

GROUP 6 – ALCOHOLS, GLYCOLS AND GLYCOL ETHERS

allyl alcohol
amyl alcohol
1,4-butanediol
butyl alcohols (iso, n, sec, tert)
butylene glycol
corn syrup
cyclohexyl alcohol
decyl alcohols (n, iso)
dextrose solution
diacetone alcohol
diethylene glycol
diethylene glycol dimethyl ether
diethylene glycol monobutyl ether
diethylene glycol monoethyl ether
diethylene glycol monomethyl ether
diisobutyl carbinol
dipropylene glycol
dodecanol
ethoxylated dodecanol
ethoxylated pentadecanol
ethoxylated tetradecanol
ethoxylated tridecanol

REACTIVITY GROUPS (Continued)

GROUP 6 - (cont'd)

ethoxytriglycol
ethyl alcohol
ethyl butanol
2-ethylbutyl alcohol
2-ethylhexyl alcohol
ethylene glycol
ethylene glycol monobutyl ether
ethylene glycol monoethyl ether
ethylene glycol monomethyl ether
furfuryl alcohol*
glycerine
heptanol
hexanol
hexylene glycol
isoamyl alcohol
isooctyl alcohol
methoxy triglycol*
methyl alcohol
methylamyl alcohol
molasses, all
nonanol
octanol
pentadecanol
polypropylene glycol methyl ether
propyl alcohols (n, iso)
propylene glycol
sorbitol
tetradecanol
tetraethylene glycol
tridecyl alcohol
triethylene glycol
undecanol

GROUP 7 - ALDEHYDES

acetaldehyde
acrolein (inhibited)
butyraldehyde (n, iso)
crotonaldehyde
decylaldehyde (n, iso)
2-ethyl-3-propylacrolein
formaldehyde solution
furfural
hexamethylenetetramine
isooctyl aldehyde
methyl butyraldehyde
methyl formal*
paraformaldehyde

GROUP 7 - (cont'd)

propionaldehyde
valeraldehyde

GROUP 8 - KETONES

acetone
acetophenone
camphor oil
cyclohexanone
diisobutyl ketone
isophorone*
mesityl oxide*
methyl ethyl ketone
methyl isobutyl ketone

GROUP 9 - SATURATED HYDROCARBONS

butane
cyclohexane
ethane
heptane (n-)
hexane (n, iso)
isobutane
liquefied natural gas
liquefied petroleum gas
methane
nonane
n-paraffins
paraffin wax
pentane (n, iso)
petrolatum
petroleum ether
petroleum naphtha
polybutene
propane
propylene butylene polymer

GROUP 10 - AROMATIC HYDROCARBONS

benzene
cumene
p-cymene*
coal tar oil
diethylbenzene
dodecyl benzene*
Dowtherm
ethyl benzene
naphtha, coal tar
naphthalene (includes molten)

*Not presently included in CHRIS system.

REACTIVITY GROUPS (Continued)

GROUP 10 - (cont'd)

tetrahydronaphthalene
toluene
triethyl benzene
xylene (m-, o-, p-)

GROUP 11 - OLEFINS

butylene
1-decene
dicyclopentadiene
diisobutylene
dipentene*
dodecene
1-dodecene
ethylene
liquefied petroleum gas
1-heptene
1-hexene
isobutylene
nonene
1-octene
1-pentene
polybutene
propylene
propylene butylene polymer
propylene tetramer (dodecene)
1-tetradecene
1-tridecene
turpentine
1-undecene

GROUP 12 - PETROLEUM OILS

asphalt
gasolines
 casinghead
 automotive
 aviation
jet fuels
 JP-1 (kerosene)
 JP-3
 JP-4
 JP-5 (kerosene, heavy)
kerosene
mineral spirits
naphtha (non-aromatic)
naphtha
 solvent
 Stoddard solvent
 VM & P

GROUP 12 - (cont'd)

oils
 absorption oil
 clarified oil
 crude oil
 diesel oil
 fuel oils
 No. 1 (kerosene)
 No. 1-D
 No. 2
 No. 2-D
 No. 4
 No. 5
 No. 6
 lubricating oil
 mineral oil
 mineral seal oil
 motor oil
 penetrating oil
 range oil
 road oil
 spindle oil
 spray oil
 transformer oil
 turbine oil*

GROUP 13 - ESTERS

amyl acetate
amyl tallate
butyl acetates (n, iso, sec)
butyl benzyl phthalate
castor oil
cottonseed oil
croton oil*
dibutyl phthalate
diethyl carbonate
dimethyl sulfate
dioctyl adipate
dioctyl phthalate
epoxidized vegetable oils
ethyl acetate
ethyl diacetate
ethylene glycol monoethyl ether acetate
ethylhexyl tallate
fish oil
glycol diacetate
methyl acetate
methyl amyl acetate
neatsfoot oil

*Not presently included in CHRIS system.

REACTIVITY GROUPS (Continued)

GROUP 13 - (cont'd)

olive oil
peanut oil
propyl acetates (n, iso)
resin oil
soya bean oil
sperm oil
tallow
tanner's oil
vegetable oil
wax, carnauba

GROUP 14 - MONOMERS AND POLYMERIZABLE ESTERS

acrylic acid (inhibited)
acrylonitrile
butadiene (inhibited)
butyl acrylate (n, iso)
ethyl acrylate (inhibited)
2-ethylhexyl acrylate (inhibited)
isodecyl acrylate (inhibited)*
isoprene (inhibited)
methyl acrylate (inhibited)
methyl methacrylate (inhibited)
beta-propiolactone*
styrene (inhibited)
vinyl acetate (inhibited)
vinyl chloride (inhibited)
vinylidene chloride (inhibited)
vinyl toluene

GROUP 15 - PHENOLS

carbolic oil
creosote, coal tar*
cresols
nonylphenol
phenol

GROUP 16 - ALKYLENE OXIDE

ethylene oxide
propylene oxide

GROUP 17 - CYANOHYDRINS

acetone cyanohydrin
ethylene cyanohydrin

GROUP 18 - NITRILES

acetonitrile
adiponitrile

GROUP 19 - AMMONIA

ammonium hydroxide

GROUP 20 - HALOGENS

bromine
chlorine

GROUP 21 - ETHERS

diethyl ether (ethyl ether)
1,4-dioxane
isopropyl ether*
tetrahydrofuran

GROUP 22 - PHOSPHORUS, ELEMENTAL

GROUP 23 - SULPHUR, MOLTEN

GROUP 24 - ACID ANHYDRIDE

acetic anhydride
propionic anhydride

*Not presently included in CHRIS system.

APPENDIX C

Appendix C: Arthur D. Little, Inc. Health and Safety Policy and Guidelines

1.0 Purpose and Scope

The purpose of this policy and guideline is to establish a consistent basis of performance throughout Arthur D. Little's activities to ensure a safe and healthful work environment.

2.0 Policy Statement

It is the policy of Arthur D. Little, Inc., to provide a work environment that complies with all regulatory requirements, and that meets or exceeds generally recognized good management practices for the occupational safety and health of its employees. Further, it is the goal of Arthur D. Little to go beyond compliance to establish work place health and safety programs that are consistent with best health and safety management practice.

3.0 Glossary and Definition of Terms

See Appendix A for the Glossary and definition of terms used in this policy.

4.0 Health and Safety Responsibilities

The Arthur D. Little Safety and Health Policy Committee is responsible for establishing policies and providing oversight of health and safety throughout the company. The Committee has delegated the following responsibilities.

Corporate Health and Safety Specialist:

- Provides technical assistance to laboratory groups.
- Advises laboratories, as requested, on health and safety regulatory requirements and good practice guidelines.
- Manages the hazardous waste disposal program.
- Checks or maintains fire safety equipment, such as portable fire extinguishers.
- Provides personal protective equipment upon request.

Environmental Health Business Segment Staff, as designated by the Managing Director, Safety and Environmental Health:

- Provide requested technical assistance in matters of occupational safety, industrial hygiene, fire safety, radiological health, laboratory ventilation, personal protective equipment, and similar matters.

- Draft or review policies and procedures for laboratory health and safety.

Managing Directors:

- Ensure that a Chemical Hygiene Plan has been developed, implemented, and communicated to section staff involved in laboratory activities. (see Section 5 of this policy.)
- Ensure that unit managers and staff in their section follow this policy, the applicable Chemical Hygiene Plan (CHP), and any additional procedures adopted within the section or laboratory area.
- Ensure that the applicable CHP is reviewed annually and updated as necessary.

Unit Managers:

- Ensure that staff in their unit follow this policy and (for laboratory staff) the applicable Chemical Hygiene Plan (CHP).
- Develop any additional procedures needed for specific areas or operations.
- Ensure that all laboratory staff receive basic training in laboratory safety and health and hazardous waste disposal. (See Section 6 of this policy.)
- Ensure that any project involving the use of hazardous materials or other safety or health hazards, receives adequate, independent environmental, health and safety review. (See Section 22 of this policy.)
- Identify the staff who should be included in the company's medical surveillance program.
- Ensure that the costs of safety equipment and reviews is considered in proposal pricing.

Laboratory Workers:

- Comply with this policy, the applicable CHP, and all other safety and health rules adopted in areas where they work.
- Wear personal protective equipment required for the task.
- Practice proper use engineering controls, such as laboratory fume hoods.
- Attend and participate in training courses, medical surveillance and personal exposure monitoring as required.
- Develop and use good laboratory techniques.
- Practice good personal hygiene and housekeeping.

Non-laboratory employees:

- Wear personal protective equipment where required.
- Attend and participate in training courses, medical surveillance and personal exposure monitoring as required.
- Develop and use safe work practices.
- Practice good personal hygiene and housekeeping.

5.0 Chemical Hygiene Plan

Managing Directors will assure that each laboratory group in their organization prepares, implements, and updates a Chemical Hygiene Plan (CHP) as required by the OSHA Standard covering any laboratory group that uses hazardous chemicals, unless there is no potential for worker exposure to hazardous chemicals. The group CHP must be readily accessible to laboratory staff in their work area.

The CHP must contain :

- Laboratory Standard Operating Procedures (SOPs) designed to protect workers from hazardous chemicals.
- Criteria used to evaluate worker exposures to toxic chemicals.
- Control measures designed to reduce exposures to toxic chemicals such as specific engineering controls, personal protective equipment, and hygiene practices.
- Procedures to ensure adequate performance of laboratory fume hoods and other ventilation systems.
- Provisions for employee training.
- Procedures for safety review and management approval before a new operation or procedures may begin.
- Provisions for medical consultation, examination or surveillance.
- Designating staff responsible for implementing the CHP.
- Additional SOPs and protective measures to be used when working with particularly hazardous chemicals such as select carcinogens, reproductive toxins, acutely toxic substances, sensitizing agents, and extremely reactive substances.
- Additional protective measures may include:

Establishing designated areas

— Establishing restricted areas

— Listing personal protective equipment requirements/consideration

- Using a glove box, or other containment equipment
- Creating negatively or positively pressurized areas
- Defining waste removal, waste disposal and decontamination procedures
- Provisions for annual review and update of the CHP.

6.0 Staff Training

6.1 Laboratory workers with potential for chemical exposure:

Before working in an area where hazardous chemicals are present, each laboratory worker shall be informed of the following:

- The OSHA Laboratory Health and Safety Standard (29 CFR 1910.1450).
- Location, contents and requirements of the laboratory Chemical Hygiene Plan.
- Location of Material Safety Data Sheets (MSDS) and other reference materials on hazardous chemicals. The available information should include:
 - PEL/TLV and action levels for chemical substances and particularly hazardous chemicals present in the work area.
 - Physical and health hazards associated with hazardous chemicals in the work area.
 - Signs and symptoms associated with overexposure to the hazardous chemicals.
 - Proper handling, storage and disposal procedures for frequently used hazardous chemicals.

Before working with hazardous chemicals, each laboratory worker shall receive the following training:

- Methods and equipment available for protection from laboratory hazards:
 - Safe work practices
 - Laboratory protocols
 - Engineering controls
 - Personal protective equipment
 - Emergency procedures.
- Methods and observations that may be used to detect the presence or release of hazardous chemicals (odors, visual appearance, alarms, monitoring devices, etc.).
- Additional training that may be required by the laboratory Chemical Hygiene Plan.

Basic health and safety training will be repeated for all laboratory staff at least every other year.

In addition, refresher training, fire extinguisher training, and emergency drills (evacuation, chemical spill, etc.) are recommended. Each laboratory group shall

determine its needs and schedule appropriate activities.

6.2 Other laboratory workers and Non-laboratory workers

Each employee should be familiar with the hazards of his or her work area or assignment. Depending on the nature of the employee's job, this may involve acquiring familiarity with:

- Location of Material Safety Data Sheets (MSDS) and other reference materials on hazardous chemicals. The available information should include:
 - PEL/TLV and action levels for chemical substances and particularly hazardous chemicals present in the work area.
 - Physical and health hazards associated with hazardous chemicals in the work area.
 - Signs and symptoms associated with overexposure to the hazardous chemicals.
 - Proper handling, storage and disposal procedures for frequently used hazardous chemicals.
 - Methods and equipment available for protection from laboratory hazards:
 - Safe work practices
 - Engineering controls
 - Personal protective equipment
 - Emergency procedures.
- Methods and observations that may be used to detect the presence or release of hazardous chemicals (odors, visual appearance, alarms, monitoring devices, etc.).
- Additional training that may be required on physical hazards, electrical hazards, fieldwork hazards, etc.

7.0 Medical Surveillance

To ensure a healthy and productive staff, medical examinations will be provided following the Arthur D. Little Medical Surveillance Program policy.

The OSHA Laboratory Standard defines certain employee rights concerning medical consultation and medical examinations. The practices of the Arthur D. Little Medical Surveillance Program protects these rights.

8.0 Work Place Chemical Exposure Policy

It is Arthur D. Little's policy to maintain worker exposures below the Action Level, i.e., half the 8 hour TWA OSHA PEL or ACGIH TLV, whichever is lower. The Action Level concept extends to all exposure guidelines, including Short Term Exposure Limits (STELs), Excursion Levels, and Ceiling Limits.

This policy reflects the desire to provide additional protection for individuals who may be

more susceptible to injury or illness from chemical exposures. It also reflects the good health and safety practice guideline to maintain all chemical exposures to the lowest practical level. Under this policy, specific protective activities or practices may be required if worker exposures exceed an Action Level.

9.0 Exposure Monitoring

Initial exposure assessment of the OSHA-regulated substances listed in Appendix B will be conducted to evaluate occupational exposures of laboratory staff. If the Action Level for a regulated substance is exceeded, exposure monitoring and medical surveillance requirements of the pertinent OSHA regulation must be followed.

Exposure monitoring and OSHA required medical surveillance may be ended according to the relevant standard.

10.0 Exposure Monitoring/ Medical Record keeping

OSHA requires that records be kept of all employee exposure monitoring results, medical tests, and medical consultations. When personal exposure monitoring is representative of co-workers' exposures, a copy of the monitoring data should also be placed in the files of the non-monitored co-workers. The Corporate Health and Safety Specialist, Mr. Richard Morrill, shall keep a central record of exposure monitoring data. The Arthur D. Little Medical Center shall maintain records of all medical tests and consultations.

Any medical or exposure monitoring records for an employee are available to that employee upon request to the Medical Center.

11.0 Laboratory Ventilation Systems

11.1 Air Supply Systems

Unless sufficient replacement or make-up air is provided, laboratories with installed exhaust hood systems may be "starved" for make-up air. This can affect both the operation of the fume hoods and control of ambient air conditions such as temperature, humidity, and fugitive emissions. All new or substantially modified fume hood (and other local exhaust ventilation) installations or modifications will provide adequate make-up air.

To prevent the spread of fugitive emissions and odors from laboratory operations, general purpose laboratories should be maintained at a slight negative pressure with respect to surrounding spaces. In some cases, for operational purposes, such as in clean rooms, etc., certain laboratories may need to be kept at slight positive pressure. Except where operational requirements prevent, all new or substantially modified laboratory installations will be designed to be at a slight negative pressure with respect to surrounding spaces.

11.2 Laboratory Local Exhaust Ventilation Systems

Laboratory processes can release significant quantities of flammable, toxic or irritating gases, vapors, smoke, or airborne particulates. Local exhaust ventilation systems can effectively control these hazardous airborne substances at the source of release. The local exhaust systems in laboratories include laboratory fume hoods, biological safety cabinets, local exhaust trunks, and glove boxes.

Local exhaust systems must function properly to be effective. These systems must be properly designed, installed and maintained. Local exhaust ventilation system designs must be reviewed and approved by a Certified Industrial Hygienist (CIH) before these systems are purchased, installed, or modified.

Laboratory exhaust ventilation systems shall be performance tested initially upon installation and at least semiannually after that by a suitably qualified person. The measurements are made to ensure that the ventilation equipment functions properly. Testing of local exhaust systems should include both inlet (or face) velocity measurements and calculation of air flow rate. Additionally, the capture efficiency of the system may be visually estimated with smoke tubes. In special cases, qualitative hood capture efficiency may be measured with tracer gas methods.

See Appendix D for guidelines on laboratory fume hoods.

12.0 Personal Protective Equipment (PPE)

It is Arthur D. Little policy to use engineering and administrative methods to control staff exposures to hazardous agents. However, it may not always be possible to prevent unprotected persons from all hazards present. In these situations, personal protective equipment may be required.

The minimum PPE normally required for anyone entering laboratories includes safety glasses with side shields and laboratory coats. Additional laboratory PPE may include gloves, aprons, face shields, chemical splash goggles, and respirators, as specified by protocols and procedures.

Outside of laboratory activities, PPE use is usually directed by specific policies, protocols, and Standard Operating Procedures (SOPs). PPE may also be used at other times when judged appropriate.

12.1 Eye Protection

Laboratory, shop, and pilot plant staff must observe the following Eye Protection practices:

- Safety glasses with side shields must always be worn by all personnel in the area, including visitors.
- Some operations may require eye/face protection besides safety glasses. For example, chemical splash goggles or a face shield may be used when working with corrosive liquids.

12.2 Respirators

Whenever someone needs to use a respirator for protection against an airborne hazard,

15.0 Hazard Identification

Arthur D. Little's complete Material Safety Data Sheet (MSDS) collection will be maintained by the Corporate Health and Safety Specialist, Mr. Richard Morrill. The contents of this collection will be accessible to Arthur D. Little employees, upon request. In addition, the Occupational Health and Safety Unit can be contacted for additional assistance.

- Do not remove or deface labels on hazardous chemicals containers.
- Always request an up to date MSDS whenever ordering any chemical substance.
- Keep a complete MSDS collection available for staff in each area.

16.0 Synthesized Chemicals

If a chemical is to be used exclusively within the synthesizing laboratory group, that group must determine if the chemical is "hazardous" according to OSHA standards. If so, laboratory staff must be appropriately trained. If the chemical's hazards and toxicity are unknown, assume it to be "hazardous."

If a newly synthesized chemical is to be used by others outside the laboratory group, then the drafting of an MSDS and chemical label for the material may be necessary. In this event, contact the Occupational Health and Safety Unit for assistance.

17.0 Warning Signs and Labels

17.1 Area Warnings

Special warnings should be posted as appropriate to identify special or unusual hazards within a room, work area, or piece of equipment. Examples include posted signs to identify carcinogens, radioactive materials, flammable liquids or gases, reproductive hazards, extremely toxic materials, or infectious and biohazard agents. Warning signs can be obtained from the Corporate Health and Safety Specialist.

17.2 Container Labels

Properly label containers used to store hazardous chemicals. This requirement applies to the manufacturer's original container, and to any containers used within the work area, e.g., safety cans, wash bottles, reagent bottles, etc.

The label must include an alert word ("Danger, Warning, or Caution"), a description of the nature of the hazards of the material, required actions to avoid injury, and potential consequences of improper handling. Small "in use" containers of liquids, such as wash bottles, must at least be clearly labelled to identify the container contents.

Any container used to collect hazardous waste must be labelled with a special Hazardous Waste labels available from the Corporate health and Safety Specialist.

18.0 Safety and Emergency Equipment

The location of safety showers, eyewash stations, first aid equipment, fire extinguishers, and other emergency equipment, should be well-marked.

- Safety shower/eye washes should be identified by a labelled "safety green" painted area or decal on the wall or floor.
- Eye washes should be test-activated by the user group at least monthly to ensure proper operation when needed. Safety showers should be tested at least annually (with the assistance of the Corporate Health and Safety Specialist). The testing should be documented. Any malfunctioning units should be immediately reported for repair.
- Fire extinguishing equipment should be identified by a labelled red painted area or decal on the wall or floor.
- Access to safety and emergency equipment must not be blocked. Do not use the open area around safety equipment or safety showers for storage.

19.0 Hazardous Waste Disposal

All hazardous waste materials must be collected and disposed according to applicable laws and regulations. For assistance in disposing of hazardous chemical wastes, contact the Corporate Health and Safety Specialist, Mr. Richard Morrill.

20.0 Radiological Safety and Health

It is Arthur D. Little policy that the health and safety hazards resulting from the use of ionizing and nonionizing radiation sources should be minimized.

Managers are responsible to ensure that their staff members comply with the Arthur D. Little *Radiation Safety Guide*. Radiological safety and health practices apply to all areas containing devices that generate ionizing and nonionizing radiation, or where radioactive material is used, stored, transferred, or handled.

20.1 Ionizing Radiation

Sources of ionizing radiation typically include X- or Gamma-ray radiographic equipment, electron beam equipment (including electron microscopes), and radionuclides used in laboratory analyses and as check sources for calibrating radiation measurement equipment. All sources of ionizing radiation must be handled following the procedures established by the Arthur D. Little Radiation Safety Committee in accordance with U.S. Nuclear Regulatory Commission regulations.

The Radiation Safety Officer has developed the *Radiation Safety Guide*, which describes the radiation safety and health program at Arthur D. Little. Copies of the guide may be obtained from the Radiation Safety Office.

The Radiation Safety Office provides an annual course, "General Radiation Safety and Health," to all persons who work with ionizing radiation sources or equipment. This

training is provided to comply with Nuclear Regulatory Commission and OSHA HAZCOM requirements.

20.2 Nonionizing Radiation

Sources of potentially hazardous nonionizing radiation include lasers, microwave equipment, and processes and equipment that emit intense visible, infrared, and ultraviolet light. Exposure to these sources of electromagnetic energy must be limited by engineering controls and personal protective equipment.

If additional information on radiological health and safety is needed, contact the Arthur D. Little Radiation Safety Officer, Susan Burrill.

21.0 Infectious and Biohazard Materials

It is Arthur D. Little policy that the health and safety hazards arising from the use of biological materials should be minimized.

Managers are responsible for ensuring that their staff comply with the Arthur D. Little Policy on Biosafety and contents of the Biosafety Manual. Biosafety practices apply to all areas where biological materials capable of producing humans disease are present. The guiding principles of biosafety, as set forth in the Centers for Disease Control/National Institutes of Health publication Biosafety in Microbiological and Biomedical Laboratories, provides the basis of Arthur D. Little biosafety programs.

Where blood and/or other potentially infectious materials containing bloodborne pathogens are present, a bloodborne pathogens management program, including implementation of an exposure control plan, will be established by the Section in compliance with the OSHA Standard on Bloodborne Pathogens (29 CFR 1910.1030).

22.0 Safety Reviews

Any new project involving the use of hazardous materials or that may pose safety or health hazards must be reviewed to ensure that adequate measures are taken to protect worker safety and health, and property. The method of review and reviewers should be appropriate for the nature and degree of potential hazard present.

A pre-startup safety review will be conducted for every new piece of prototype hardware, every new pilot plant experimental set-up, and every experiment involving equipment larger than "bench scale." The pre-startup safety review will be documented in a memo to the case file, copies to the Corporate Health and Safety Specialist, indicating the date, participants, and conclusions of the review.

Any new project meeting the criteria listed in Appendix E must have a safety review involving participation by safety and health specialists who are not part of the project team.

The costs of these safety reviews and of any required mitigation will be borne by the project.

23.0 Emergency Notification and Evacuation

Anyone who detects a fire should immediately pull a fire alarm box and leave the area. When fire alarms sound, everyone must evacuate the building(s) involved.

For other types of emergencies, including medical emergencies and chemical spills, dial extension 5555 (at Acorn Park) or extension 2000 (at Memorial Drive) for assistance.

APPENDIX A

American Conference of Governmental Industrial Hygienists (ACGIH) - A professional organization of industrial hygienists. ACGIH publishes the Threshold Limit Value (TLV®) list, Industrial Ventilation, and other health and safety references.

Action Level (AL) - As defined by OSHA for specific chemical substances, one half the permissible exposure limit (PEL). For certain regulated chemicals, workplace exposures above the AL require certain activities, such as air monitoring and medical surveillance of exposures workers. More generally, an Action Level refers to an exposure equal to half the 8 hour TWA PEL or TLV, whichever is lower.

Ceiling Limit - A special designator for an ACGIH TLV. An airborne exposure (in parts per million or mg/cubic meter) that should not be exceeded at any time. Assigned to chemicals with very rapidly acting toxic or irritating effects.

Chemical Hygiene Plan (CHP) - A written document required by the OSHA Laboratory Safety Standard (29 CFR 1910.1450) for all laboratory activities that use hazardous chemicals. The CHP must describe practices and procedures used to control work place hazards and worker exposures from hazardous chemicals used in the laboratory.

Designated Area - An area that may be used for work involving particularly hazardous chemicals. A designated area may be all or part of a laboratory. It also may be a specified piece of equipment such as a laboratory fume hood or a biological safety cabinet.

Dilution Ventilation - the use of large quantities of uncontaminated fresh air to disperse a gaseous airborne contaminant.

Excursion Level (EL) - as defined by OSHA for specific chemical substances, a regulated short term occupational exposure limit, usually for 15 minutes.

Hazard - a chemical or physical condition that has the potential for causing damage, injury, or other type of harm or loss to people or property.

Hazardous Chemical - A chemical for which there exists statistically significant evidence (95 percent confidence) that adverse acute or chronic health effects may occur from human overexposure. Any chemical substance that causes cancer or other diseases or damages the eyes, skin, heart, liver, kidney, central nervous system, lungs, brain, blood-forming organs, etc. is a hazardous chemical.

Laboratory - A work area where small quantities of hazardous chemicals are used or produced in non-commercial quantities.

Laboratory Fume Hood - A specialized type of local exhaust booth hood commonly used in laboratories to control airborne chemical hazards. At Arthur D. Little, laboratory fume hoods must meet design, installation and performance standards.

Laboratory Group - One or more laboratories that have adopted the same CHP. To be included, each laboratory in the group must do similar tasks using similar procedures and similar hazardous chemicals. The laboratories comprising the group need not be

physically near each other.

Local Exhaust Ventilation (LEV) - the use of an exhaust hood, i.e., a suction inlet or ventilated enclosure, to capture or contain an airborne contaminant at the point of release.

Material Safety Data Sheet (MSDS) - A document consisting of one or more pages of information about a chemical material. MSDS's are formatted into nine sections that includes information about the chemical material's Occupational Exposure Limits, physical properties, fire, explosion and reactivity, health hazards, etc. MSDS's are normally provided by the manufacturer of the material, although commercial MSDS collections are available. Maintenance of an MSDS collection is a requirement of the OSHA HAZCOM Standard (29 CFR 1910.120), the Canadian Hazardous Products Act, and other governmental authorities around the world.

NIOSH - the National Institute of Occupational Health and Safety, a US governmental agency, part of the Health and Human Services Department. NIOSH establishes Recommended Exposure Limits (RELs), for airborne chemicals, certifies respirators, and conducts and funds health and safety research.

OSHA - the Occupational Safety and Health Administration, a US governmental agency, part of the Department of Labor. OSHA promulgates and enforces workplace health and safety standards.

Particularly Hazardous Chemical - The OSHA Laboratory Standard specifies certain carcinogens and reproductive toxins as particularly hazardous substances. A chemical with a TLV or PEL equal to or less than 0.1 mg/cubic meter (particulates), or 10 ppm (vapors and gases).

Permissible Exposure Limit (PEL) - the regulated workplace exposure standards enforced by OSHA. An airborne concentration in parts per million (v/v) or mg/cubic meter expressed as an 8 hour time weighted average (TWA).

Regulated Area - An area where access is restricted to authorized persons only. Access to this area may be controlled by secure barrier such as a locked door, or administratively such as training requirements, sign-in log, permit system, etc.

Safety - The condition characterized by level or degree of freedom from potential harm, injury, or damage resulting from abnormal or unexpected activities or events.

Select Carcinogen - As defined in the OSHA Laboratory Standard, any substance that meets any of the criteria below:

- Regulated by OSHA as a carcinogen,
- Listed as a Group 1 human carcinogen by the International Agency for Research on Cancer (IARC) (Appendix A)
- Listed by IARC as Group 2A or 2B (expected carcinogen) and according to the National Toxicology Program (NTP) causes a statistically significant tumor incidence in experimental animals.

Skin notation - A special designator for an ACGIH TLV. Chemical substances assigned a Skin ("S") notation have the potential to be absorbed in significant quantities through the intact skin and mucous membranes. Laboratory procedures involving use of chemicals with the Skin notation should require the use of laboratory apparatus or personal protective equipment to avoid contact with the material.

Standard Operating Procedure (SOP) - A step-by-step health and safety procedure to be followed when working with hazardous chemicals. Following these procedures should minimize potential exposures to hazardous chemicals.

Threshold Limit Value (TLV)® - The recommended workplace exposure limits from the annually published ACGIH TLV® List. ACGIH bases TLVs upon best available knowledge from human experience and laboratory testing. TLVs are believed adequate to protect most workers over their working lifetime. However, given the variability in the population, the adherence to TLV guidelines may not sufficiently protect all persons from illness or injury.

Generally the TLV refers to an airborne concentration in parts per million (v/v) or mg/cubic meter expressed as an 8 hour time weighted average (TWA). Besides the TWA value, the TLV list also may contain:

- 15 minute Short Term Exposure Limits (STELs) for chemicals of rapid toxic effect.
- Ceiling ("C") limits not to be exceeded at any time, usually for chemicals that are strong irritants.
- Skin ("S") notation, for chemicals that can be absorbed through the skin.

APPENDIX B

List of OSHA Regulated Hazardous Substances

29 CFR §1910

- 1910.1001 Asbestos, tremolite, anthrophyllite and actinolite
- 1910.1002 Coal Tar Pitch Volatiles
- 1910.1003 4-Nitrobiphenyl
- 1910.1004 Alpha-Naphthylamine
- 1910.1006 Methyl chloromethyl ether
- 1910.1007 3,3'-Dichlorobenzidine (and its salts)
- 1910.1008 bis-Chloromethyl ether
- 1910.1009 beta-Naphthylamine
- 1910.1010 Benzidine
- 1910.1011 4-Aminodiphenyl
- 1910.1012 Ethyleneimine
- 1910.1013 beta-Propiolactone
- 1910.1014 2-Acetylaminofluorene
- 1910.1015 4-Dimethylaminoazobenzene
- 1910.1016 N-Nitrosodimethylamine
- 1910.1017 Vinyl chloride
- 1910.1018 Inorganic Arsenic
- 1910.1025 Lead
- 1910.1028 Benzene
- 1910.1029 Coke oven emissions
- 1910.1043 Cotton dust
- 1910.1044 1,2-Dibromo-3-chloropropane
- 1910.1045 Acrylonitrile
- 1910.1047 Ethylene oxide
- 1910.1048 Formaldehyde
- 1910.1101 Asbestos

APPENDIX C

Partial List of Particularly Hazardous Chemicals

Select Carcinogens:

IARC Group 1, 2A and 2B chemicals; NTP "known" carcinogens.

Acrylonitrile
Actinomycin D
Adriamycin
Aflatoxins
Amitrole
Analgesic mixtures
Arsenic
Asbestos
Auramine
Azathioprine
Benzene
Benzidine
Benzidine-based dyes
Beryllium
N, N-Bis (2-chloroethyl) -2-naphylamine (Chlomaphazine)
Bischloroethyl nitrosourea (BCNU)
Bis (chloromethyl)
1,4-Butanediol dimethanesulphonate (myleran)
Cadmium
Carbon Tetrachloride
Certain combined chemotherapy for Lymphomas (including MOPP)
Chlorambucil
Chloramphenicol
1-(2-Chloroethyl)-3-cyclohexyl-1 nitrosourea (CCNU)
Benzotrichloride
Chloroform
Chlorophenols
Chromium
Cisplatin
Cyclophosphamide
Dacarbazine
DDT
3,3'-Dichlorobenzidine
Diethylstilbestrol
Diethyl sulphate
3,3'-Dimethoxybenzidine (ortho-Dianisidine)
Dimethylcarbamoyl chloride
Dimethyl sulphate
1,4-Dioxane
Epichlorohydrin

Estrogens and progestins:
 Combined oral contraceptives
 Sequential oral
 Conjugated Estrogens
 Estrogens:
 Dienoestrol
 Diethylstilboestrol
 Ethinylloestradiol
 Mestranol
 Oestradiol-17B
 Oestrone
 Ethylene dibromide
 Ethylene oxide
 Ethylene thiourea
 Formaldehyde (gas)
 Hydrazine
 Melphalan
 Metoxsalen with ultra violet A therapy (PUVA)
 Methronidazole
 Mustard Gas
 2-Naphthylamine
 Nickel
 Nitrogen mustard
 Norethisterone
 Progesterone
 Oxymetholone
 Phenazopyridine
 Phenacetin
 Phenoxyacetic acid herbicides
 Phenyton
 Polychlorinated biphenyls
 Procarbazine
 Propylthiouracil
 Soots, tars and oils
 Benzo [a]pyrene
 Tetrachlorodibenzo-para-dioxin (TCDD)
 Thorium dioxide
 ortho-Toluidine
 Treosulphan
 2,4,6-Trichlorophenol
 Tris(azinidiny)-para-benzoquone (Triaziquone)
 Tris(1-aziridiny) phosphine sulphide (Thiotepa)
 Uracil mustard
 Vinyl chloride

APPENDIX D

Arthur D. Little, Inc.

Laboratory Fume Hood Guidelines

1.0 Purpose and Scope

The purpose of this guideline is to establish a consistent basis of design, performance and maintenance of laboratory fume hoods throughout Arthur D. Little's laboratory activities to ensure a safe and healthful work environment.

This Arthur D. Little health and safety guideline applies to all laboratory operations where typical laboratory booth-type fume hoods are used to control exposures to airborne chemicals from laboratory operations.

The OSHA standard, "Occupational Exposures to Hazardous Chemicals in Laboratories" (29 CFR 1910.1450), has certain requirements for use of laboratory fume hoods, and the practices outlined in this policy are meant to assure compliance with these regulatory requirements.

2.0 Fume Hood Design and Performance Criteria

All laboratory fume hoods at Arthur D. Little must meet basic design and performance criteria. These design guidelines will be applied to all new installations and renovations. The performance guidelines will apply to all fume hoods.

2.1 Fume Hood System Design

- The hood must be of the modern tapered inlet, airfoil sill, by-pass design.
- The base of the fume hood must be dished or lipped to contain a modest spill within the hood.
- The hood must have an array of baffles or slots at the rear to distribute the exhaust flow evenly and direct flow away from the operator's breathing zone.
- Fume hoods (and other local exhaust hoods in the laboratory) should have a label attached listing the design hood flow rate (cubic feet per minute - CFM and cubic meters per second - m^3/s) and the hood flow resistance (static pressure or SPh, inches or mm water gage).
- Laboratory fume hoods should be equipped with indicating gages (Dwyer Magnahelic(R) or equivalent) to constantly monitor hood function. The indicated gage reading should be calibrated in duct static pressure (SP) corresponding to the required hood air flow rate.
- No dampers are to be installed in fume hood exhaust systems.

- Fume hoods are not to have built-in exhaust fans.
- Except for doubled 4 and 6 foot fume hoods, fume hoods are not to be "ganged" together. It is usually best to connect each hood to an individual exhaust duct and fan.
- The fan and ducts should be corrosion resistant.
- Locate the fan on the roof to keep all ducts within the facility under negative pressure.
- Provide the fan with a vertical discharge stack.

2.3 Requirements for Special Purpose Fume Hoods

- Critical fume hood systems, i.e., those that handle extremely toxic or hazardous materials or radionuclides in greater than exempt quantities, should be equipped with an electric sensor indicating gage (Dwyer Photohelic(R) or equivalent). An alarm should be triggered if the hood flow rate varies from design limits.
- Fume hoods specified for use with more than "exempt" quantities of radionuclides shall have the interior constructed of seamless stainless steel and shall be fitted with appropriate air filtration to prevent emissions.
- Fume hoods specified for use of perchloric acid have additional requirements:
 - The hood interior must be constructed of sealed type 316 stainless steel.
 - The duct must be constructed of either stainless steel or unplasticized PVC.
 - All duct joints must be welded.
 - Install a high efficiency wet scrubber, suitable for perchloric acid service, to control emissions.
 - Duct runs should be straight and vertical.
 - The hood and duct must be equipped with a water wash down system.
 - The exhaust fan must be suitable for perchloric acid service, and lubricated only with fluorocarbon-type grease.
 - Single hood-duct-fan systems are required

2.4 Fume Hood Performance - Hood Face Velocity

- Fume hoods should have an average face velocity of 80 - 100 feet per minute (FPM) (0.4 - 0.5 m/s). All new installations should be designed to provide constant velocity regardless of sash position, so the hood can be used fully opened. All existing installations will be clearly marked with a safe operating height (see section 2.6).
- Avoid face velocities above 120 FPM - the turbulence created can sweep airborne contaminants back into the worker's breathing zone.

2.5 Fume Hood Systems

Standard by-pass hoods normally exhaust a constant flow of air regardless of hood sash position. Some by-pass hoods are fitted with auxiliary air chambers that supply outside air directly to the fume hood face area. By-pass hoods can be equipped with automatic

flow control monitors that vary exhaust flow rate with sash position to maintain the correct face velocity. However,

- To maintain dilution flow of air within the hood chamber, the minimum air flow rate through a flow-controlled fume hood must not be less than 20% of the hood flow rate with the sash wide open, (e.g., 200 - 250 CFM for a standard 6 foot hood).
- System operation must be constantly monitored, and designed to be fail-safe: if the controller fails, maximum exhaust and supply flows should be maintained.

Another practical method to reduce hood flow rate is to install a permanent transparent horizontal sliding safety shield in front of the sash. The shield blocks 20 - 25% of the hood face, allowing a corresponding savings due to reduced hood exhaust volume and make-up air requirements.

2.6 Hood Sash Arrow Indicators

"Arrow" indicators on the hood sash and sides for "Proper fume hood sash height" must be present on fume hoods installed before 1990, if they cannot provide exhaust velocity between 80 and 120 fpm at all sash positions.

These indicators are not permitted on hoods installed after 1990.

2.7 Effects of Room Air Turbulence

Turbulent air currents within the laboratory can interfere with proper fume hood function. High exit velocities from ceiling HVAC supply registers, open doors or windows, or staff traffic all produce significant air turbulence. These conditions may detrimentally affect the capture efficiency of laboratory fume hoods. Turbulence can have a greater effect upon fume hood capture efficiency than the hood face velocity. To prevent air turbulence problems, the following guidelines should be followed to the extent practical:

- Locate fume hoods away from high traffic areas and doors or windows.
- Except for emergencies, windows in laboratories should not open.
- HVAC systems should supply air to the laboratory via either a perforated ceiling supply plenum, or an array of multiple low velocity supply registers.
- Avoid installations where air supply registers discharge air directly towards the fume hood.
- Guideline for room air turbulence, ≤ 25 fpm at the hood face with hood turned off.

3.0 Work Practice Guides For Laboratory Fume Hoods

A laboratory fume hood cannot protect a worker against all materials and processes that may occur in the hood. Protection may be inadequate for materials with extremely low occupational exposure limits, i.e., those in the parts per billion (ppb) range. In these circumstances glove boxes or other totally enclosing controls systems should be used. However, for ordinary laboratory operations, a well-designed and properly installed fume hood can provide adequate protection for laboratory workers. The following work practices should be followed to ensure fume hood effectiveness:

- Conduct all operations that release significant quantities of airborne materials inside a fume hood.

- Keep all containers and apparatus at least six inches back from the front of the hood. Indicator marks on the hood base or side walls may be useful reminders.
- Do not extend the head inside the hood when operations are underway.
- Do not use the hood for waste (evaporative) disposal except for very small quantities of volatile materials (i.e., less than 50 ml).
- Do not store unused chemicals or apparatus inside the fume hood. Store chemicals in approved storage cabinets.
- Keep the hood sash closed as much as possible.
- Do not obstruct the slots or baffles in the rear of the hood.
- Minimize foot traffic pass the hood.
- Keep laboratory doors and windows closed.
- Except for maintenance or repair, do not remove hood sash, horizontal sliding safety panels, airfoil sill, or rear baffles.
- No permanent electrical receptacles are permitted inside the hood.
- Use a safety shield or barricade if there is possibility of an explosion.
- For hoods that can be turned on and off in the laboratory, ensure that the hood is on whenever using the hood.
- Ensure that the fume hood system is adequately functioning and maintained. Report any suspected problems to Facilities for repair.

4.0 Hood Testing and Maintenance

Fume hoods and other local exhaust equipment in the laboratory shall be performance tested initially upon installation by the contractor, and at least semiannually after that by a suitably qualified laboratory staff member. Documented routine measurements are needed to ensure that control equipment continues to function properly. Fume hoods equipped with constant monitoring gages and flow controlled hoods also require routine testing to document operation of the hood and the hood flow monitors. A sample form for documenting routine hood testing is attached to this guideline.

The routine fume hood measurements should include:

- Face velocity measurements with the sash wide open.
 - A minimum of 9 face velocity measurements in a grid pattern for a standard 4 - 6 foot fume hood.
 - Variation in face velocity measurements should not exceed ± 20 FPM (± 0.1 m/s).
- For hoods equipped with auxilliary air, turn off the auxillary air supply when testing

hood face velocity.

- Calculation of air flow rate (CFM or m^3/s)
 - Face area times average face velocity
- Estimating hood capture efficiency with smoke tubes.
 - Observe whether puffs of smoke flow directly back towards the hood baffles or whether reverse flow out of the hood occurs.
- For those hoods equipped with Hood Static Pressure gages, the hood static pressure should be measured with another gage to check the accuracy of the installed gage.
- In special cases, such as fume hood systems handling extremely toxic or hazardous materials, the fume hood capture efficiency may be measured with tracer gas methods.

If advice on a ventilation problem is needed, or if special hood testing is required, contact the Occupational Health and Safety Unit for assistance.

APPENDIX E

Arthur D. Little, Inc. Criteria for Requiring Independent Environmental, Health, and Safety Review

Independent EHS review is required if any of the following criteria are met:

1. The project will be done at the pilot plant
2. The project involves apparatus larger than "bench scale".
3. The project will be running outside of the normal working hours of project staff.
4. The project involves the use of hazardous chemicals (i.e., those listed in Appendix B or Appendix C, and safety policy or other materials deemed hazardous).
5. The project involves the use* at one time of more than 1 liter of flammable liquid.
6. The project involves the use of any flammable gas (except where used solely to feed an analytical chemistry instrument).
7. The project involves the use of radioactive material.

* In this context, use means involved in the experiment or analysis, not including material stored in the area or connected as a reservoir.

APPENDIX D

Appendix D: Arthur D. Little, Inc. Respiratory Protection Program

RESPIRATORY PROTECTION PROGRAM

User Training Information

Corporate Safety Monitoring Group

Arthur D. Little, Inc.

Cambridge, MA

September, 1981

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VII.	Summary of Standard Operating Procedures
VIII.	Emergency Procedures

Section I

INTRODUCTION

This Respiratory Protection Program is designed to set forth accepted practices for respirator use, as well as to provide information for the proper selection, use, and care of these devices.

This program underscores the commitment by the management of Arthur D. Little Inc. to provide a safe and healthful work environment for all employees. Thus, the ultimate goal of this program is not only to comply with Federal health and safety regulations, but to go beyond those regulations in order to attain the safest, most healthful work conditions possible.

Section II

EMPLOYER AND EMPLOYEE RESPONSIBILITY

A. Employer Responsibility

- ADL will be responsible for the establishment and administration of a respiratory protection program.
- Respiratory protective devices will be provided by ADL when it has been determined that such devices are necessary to protect the health of the employee.
- ADL will provide the respiratory protective device suitable for its intended use.

B. Employee Responsibility

- The employee will use the respiratory protective equipment issued to him/her in accordance with the instructions and training received.
- The employee will guard against damage or loss of this equipment, and shall be responsible for its inspection, maintenance, and cleaning.
- The employee will report immediately any trouble or malfunction of the respirator to his/her supervisor. Defective respirators will be taken out of service immediately and the problem corrected.
- As is the case with other company health and safety rules, the supervisor is responsible for ensuring that those individuals in his/her charge are complying with the rules governing the use of these devices.
- Employees are responsible for complying with all safety procedures and regulations, informing supervisors or the safety organization of actual or potentially hazardous conditions, reporting injuries and accidents promptly to supervisors, and for being aware of and developing safe work practices.

Section III

NEED AND SELECTION OF RESPIRATORS

A. The need for Respiratory Protection

It is recognized that the use of respiratory protection by itself is not as effective as engineering and administrative methods in controlling potentially hazardous atmospheres. However, under certain conditions the use of respirators is required. Quite often respirators are employed to supplement other methods of control (ventilation, isolation, work practices, etc.), especially when the operational conditions, because of their nature, cannot be totally controlled by engineering and administrative methods. Respiratory protection is also employed when these methods are not readily applicable or practicable, and as a supplement to provide an added margin of safety when working with highly hazardous materials.

B. Selection of the Respirator

You should be familiar with the hazards and characteristics of the chemicals with which you are working. One source of such information is the Material Safety Data Sheet (MSDS) which should be available from the supplier of the chemical. The MSDS should contain information on first aid and emergency procedures.

In addition to operations using hazardous chemicals, some operations at ADL involve biohazards (disease-producing microorganisms) and may require the use of respirators equipped with high-efficiency particulate filters (HEPA filters).

Risk assessment and respirator selection are based on a review of the scientific literature, types of protective equipment available, work conditions, and professional judgement. A respiratory hazard exists when a substance is present in the atmosphere of the work area in a specific concentration and under particular conditions to produce bodily harm when inhaled. Evaluation of the need for respirators and selection of the appropriate type of respirator for each use should be made by a qualified industrial hygienist

Section IV

MEDICAL ASSESSMENT

Persons should not be assigned tasks requiring the use of respirators unless they are physically able to perform the work and use the equipment. In addition, the wearing of respirators should not produce undue stress or place them at risk. Anyone who suffers from respiratory disease or difficulty should receive a medical evaluation for assessment of the employee's capability to wear a respirator.

Section V

ISSUANCE AND TRAINING PRACTICES

A. Issuance

Each employee who is to be issued a respirator will be fit-tested with a respirator to ensure proper fit.

Respirators will not be issued to persons whose facial hair prevents the attainment of a satisfactory facepiece-to-face seal as determined by the Qualitative Fit-Test Procedure.

B. Fit-Test Procedures for Respirator Users

Before entering an area where respirators are required, the respirator user should check his/her respirator to make sure that it will not leak while it is being worn. The positive pressure test and/or negative pressure test is used for this check.

1. Positive Pressure Test:

Close the exhalation valve with the thumb or palm and exhale gently into the facepiece. The fit is considered satisfactory if a slight positive pressure can be built up inside the facepiece without any evidence of outward leakage of air at the facepiece-to-face seal.

2. Negative Pressure Test:

Close off the inlet opening of the canister or cartridge(s) by covering with the palm of the hand(s) or by replacing the tape seal(s). Inhale gently so that the facepiece collapses slightly and hold the breath for approximately 10 seconds. If the facepiece remains in its slightly collapsed condition and no inward leakage of air is detected, the fit of the respirator is considered satisfactory. If an inward leakage is noted, readjust the facepiece and/or headbands until a satisfactory seal is obtained.

C. Training

All employees who are issued respirators will receive initial and periodic training from the Safety Monitoring Group. This Respiratory Protection Program manual serves as the basis for such instruction.

Section V (Cont.)

D. Types of Respirators - Their Uses and Limitations

In general, respiratory protective equipment falls into three basic categories according to their method of operation: air purifying, supplied air, and self-contained breathing apparatus.

D. 1. Air Purifying Devices:

An air purifying respirator is one that removes contaminants from the ambient air. The purification of the air is accomplished by mechanically filtering out particulate contaminants with fibrous media or by removing contaminating gases or vapors by physical or chemical means. Cartridges, canisters, and other filters are employed for this purpose. Three types of air purifying devices are the: half-face respirator, full-face respirator, and full-face gas-mask.

Air purifying media consist of fiber filter and/or sorbents contained in a protective casing (cartridges or canisters). A fiber filter will remove particles from the airstream. THESE FIBROUS FILTERS ARE NOT EFFECTIVE AGAINST GASES AND VAPORS. Sorbents are used for removing gases and vapors from the airstream. They are not, by themselves, effective against particles, but must be used in combination with fibrous filters in mixed contaminant atmosphere.

The service life of the filter media and sorbents depends on many factors including the concentration on the contaminant in the air and the length of time the cartridges or canisters are in use.

The service life of sorbent media expires when an odor and/or nose/throat irritation is noticed by the user. If a full-face-piece is used; eye irritation may also signify the exhaustion of the media. The service life of a fibrous filter is limited by the amount of material (e.g. dust) that can be retained before the resistance to inhalation increases significantly. Sorbent cartridges and canisters should always be kept sealed until installed on the respirator because exposure to high humidities might shorten their useful service lives. Unsealed, unused cartridges and canisters may be kept for use up to one (1) year if attached to a respirator and sealed in a plastic bag.

Section V (Cont.)

General Limitations of Air Purifying Devices

- a. Air purifying respirators remove a specified contaminant from inhaled air. These devices do not supply oxygen; therefore, they may not be used in atmospheres deficient in oxygen.
 - b. This type of respiratory protection is to be used strictly in accordance with instructions given, labels, and limitations pertaining to the device.
 - c. Never alter or modify the respirator. Use only parts designated by the manufacturer.
 - d. Glasses or contact lenses should not be used when wearing a full-face respirator. A spectacle frame assembly with corrective lenses that can be inserted into the facepiece is available.
- D. 1. e. Particulate (fibrous media) cartridges or canisters alone are of no value against chemical vapors or gases. Sorbent cartridges or canisters alone are not effective against particulates.

2. Supplied Air Respirators

An atmosphere-supplying respirator is one that furnishes respirable air or oxygen to the wearer from an uncontaminated supply such as a compressed-breathing air or oxygen cylinder, an oxygen-generating canister, or a breathing-air compressor that draws its supply from an uncontaminated ambient atmosphere. This type includes air-line respirators and self-contained breathing apparatus. These devices have various working modes.

General Limitations on Air-Line Respirators

Although most atmosphere-supplying respirators are capable of providing protection against high concentrations of many toxic materials, no device is 100% efficient. Some leakage into the facepiece may occur in some of these devices. Limitations on their use by persons with beards, eyeglasses, etc., are identical to the limitations on similar use of air-purifying facepieces of the same design. There are additional limitations for these devices:

Section V (Cont.)

- a. There is no respiratory protection if the oxygen or air supply fails (unless an auxiliary supply is available).
- b. As is the case with air-purifying respirators, air-line respirators generally furnish no protection other than to the face, against contaminants irritating to the skin or mucous membranes, nor any protection against materials that can be absorbed through unbroken skin.
- c. The wearer's travel is limited by the length of the air-supply hose.
- d. These devices cannot be used for emergency or rescue devices.

General Limitations of Self-Contained Breathing Apparatus

The self-contained breathing apparatus (SCBA), which has an air or oxygen supply carried by the wearer, generally affords a higher level of protection to the user than an air-line respirator. However, these devices also have limitations.

- a. The length of time that each of these devices may be used is limited by the air or oxygen supply that the wearer can carry. For each device the manufacturer's instructions must be consulted; however, the service time of these devices generally ranges from 5 minutes to 30 minutes.
- b. Further limitations on the use of these devices may result from their size and weight when work is to be done in a very confined space, or when small individuals must carry the relatively heavy equipment.

Section VI

INSPECTION, CARE, AND MAINTENANCE OF RESPIRATORS

A. Inspection

All respirators should be inspected routinely before and after each use by the employee to whom the respirator has been issued.

Respirator inspection shall include:

- Check of the tightness of connections and the condition of the facepiece;
- Check of the headbands;
- Check of the valves and valve seats;
- Check of the connecting tube and canisters, air or oxygen cylinders (if any);
- Check of rubber or elastomer parts for pliability and deterioration;
- Check of regulators, fittings, and gauges (if any).

B. Care (Cleaning and Disinfection)

Respirators should be cleaned after each day's use by the individual to whom the respirator has been issued.

Cleaning Procedures

1. Remove any filters, cartridges, canisters, headbands, and disassemble the major respirator parts. Do not disassemble regulators on air-line respirators or self-contained breathing apparatus.
2. Wash all respirator parts (except cartridges, canisters, and elastic headbands) in warm (about 120°F) soapy water. A plastic bristle hand brush is particularly useful in removing dirt from respirator parts. Headbands can be wiped down with a damp cloth or paper toweling.
3. Thoroughly rinse all parts in warm water.
4. Disinfect the respirator on a weekly basis. Following step 1, immerse respirator parts in cleaner-disinfectant solution for 10 minutes (minimum) contact time. (A quarternary ammonium disinfectant/detergent combination is most suitable for this application). Rinse completely in warm water. (Do not use alcohol or other organic solvents since these compounds deteriorate the rubber elastomer). For those using respirators

Section VI (Cont.)

in biohazard areas, i.e. those areas involved with infectious microorganisms, disinfection should be performed on a daily basis.

5. Air dry or wipe dry with paper toweling.
6. Reassemble the respirator and insert new filters and/or cartridges or canisters if they are needed. Be sure not to overtighten cartridges since this may strip the threads of the cartridge housing.
7. Place the respirator in a plastic bag and seal it for storage. Fullface gas masks should be returned to their plastic carry cases. Plastic bags are available as a stock item. Should these bags become torn, they should be replaced.

C. Maintenance

Repair and/or replacement of a respirator or its component parts should be done only by trained persons with parts designed specifically for that respirator. Contact Gus Skamarycz when respirator repair is needed.

No attempt should be made to replace or substitute parts or to make adjustments or repairs beyond the manufacturer's recommendation. To do so will void the respirator certification (by the National Institute for Occupational Safety and Health) or cause it to malfunction and thereby not provide the expected protection to the wearer.

Most cartridges and canisters do not have an end-of-life indicator that shows the user that the sorbent properties of the device are exhausted. Cartridges and canisters should be dated each time they are changed so that a regular change interval can be maintained. If the user smells or tastes an odor or experiences respiratory tract irritation, discomfort, or dizziness, he/she should immediately leave the area and put new cartridges or a new canister on the mask, being careful to use the correct replacement type and make.

Auxiliary dust filters, high-efficiency filter cartridges (HEPA filters) and canisters (which have built-in filters) should be changed when there is an increase in breathing resistance; i.e. when breathing becomes difficult.

Section VI (Cont.)

in biohazard areas, i.e. those areas involved with infectious microorganisms, disinfection should be performed on a daily basis.

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Auxiliary dust filters, high-efficiency filter cartridges (HEPA filters) and canisters (which have built-in filters) should be changed when there is an increase in breathing resistance; i.e. when breathing becomes difficult.

Section VI (Cont.)

D. Storage

After inspection, cleaning, and necessary repairs, respirators should be stored to protect them against dust, sunlight, heat, extreme cold, excessive moisture, chemical and biological contamination, and theft.

Routinely used respirators, such as half-face respirators, should be placed in plastic bags.

Respirators should not be placed in lockers unless they are in plastic bags and protected against damage.

Respirators should be packed or stored so that the facepiece and exhalation valve will not rest in a distorted position.

Section VII

SUMMARY OF STANDARD OPERATING PROCEDURES

Both the employer and the employee share responsibility in making and keeping the work environment safe and healthful.

The need and selection of respiratory protection will be based on a risk assessment for the operation.

Those individuals who have the need to wear a respirator will be fit-tested to ensure a properly fitting respirator. Employees who are issued respirators will be trained in the use and limitations of those devices.

Employees are responsible for properly inspecting, maintaining, and storing respirators which are issued to them. ADL will provide equipment and supplies for the proper cleaning, maintenance, and storage of respirators.

Respirators must be used in accordance with instructions and training received. To assure proper protection, the respirator must be checked by the wearer using the positive and/or negative pressure test. This must be performed each time the respirator is put on.

Respirators must be returned promptly to the Chairman of the Safety Monitoring Group when the individual is no longer required to wear this device as part of the job, either because of job transfer or termination.

Section VIII

EMERGENCY PROCEDURES

STEPS TO BE FOLLOWED IN THE EVENT OF AN EMERGENCY

- In an emergency situation, for example a large chemical spill or a biohazard spill, the wearer of the respirator should leave the area immediately because even with a respirator he/she may be overcome by a toxic or oxygen-deficient atmosphere or be contaminated with biohazardous microorganisms.
- If others are in the area, warn them to leave immediately.
- Close off the area and post with warning.
- Dial the EMERGENCY TELEPHONE NUMBER (5555 or 2000). Give your name, telephone extension, and the location of the emergency. Also, explain the nature of the emergency, if known.
- If any contact should be made with chemicals or especially infectious organisms, go directly to an emergency shower station or change room first and remove all contaminated clothing and equipment and then shower. Place contaminated clothing and equipment in an impervious container so that the contamination will not spread. This is particularly important in the case of a biohazard spill. If the supervisor and Safety Office have not yet been notified, contact them at this time.
- Never enter a dangerous atmosphere (e.g. spill site) without first obtaining the proper protective equipment.
- The Emergency Action Response Team will advise the operating groups of the proper procedures and equipment for handling the emergency.
- Never enter the area of the spill without at least one additional person present. He/she must remain in a safe location. This second person must also be equipped with the appropriate respirator and other protective equipment in order to enable him/her to aid the person in the dangerous atmosphere if problems are encountered.

APPENDIX E

Appendix E: References

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*Note: Indicates that can be listed to obtain physical and health hazards of specific chemicals.

APPENDIX F

MASTER LIST

Chemical Name	Irritant	Corrosive	Sensitizer	Toxic	Highly Toxic	Carcinogen	Flammable Liquid/Solid	Compressed Gas	Explosive	Reactive
Benzyl Triethyl ammonium Hydroxide					X		X (Liquid)			
(Para) Nitrobenzeneazoresorcinol				X						
O-Toluic Acid				X						
1,1,1-Trichloroethane	X									
1,1,2-Trichloroethane	X					X (Suspect)				
1,2,3,6-Tetrahydrobenzaldehyde		X								
1,3-Butadiene						X (Suspect)	X (Gas)	X		
1,3-Dioxane							X (Liquid)			
1,4-Dibromobutane	X									
1,4-Dioxane						X (Suspect)	X (Liquid)			
1,4-Dioxane						X (Suspect)	X (Liquid)			
1,5-Diphenylcarbazide										X (Light)
1-Bromo-4-Ethyl Benzene	X									
1-Bromopropane	X						X (Liquid)			
1-Nitropropane				X			X (Liquid)			
1-Octanol	X									
1-Propanol	X						X (Liquid)			
2,3, or 4-Nitrophenol	X			X						
2,4-Dinitrophenylhydrazine							X (Solid)			
2,6-Dimethyl Thiophenol	X									
2,6-Lutidine	X						X (Liquid)			
2,9-Dimethyl 1,10-Phenanthroline Hemihydrate	X									
2-Amino-2-Methyl-1-Propanol	X									
2-Butyl Lithium										X (Moisture)
2-Chloro Ethyl Ether						X (Suspect)				

MASTER LIST

Chemical Name	Irritant	Corrosive	Sensitizer	Toxic	Highly Toxic	Carcinogen	Flammable Liquid/Solid	Compressed Gas	Explosive	Reactive
2-Ethoxy Benzaldehyde	X									
2-Ethyl Hexylamine	X			X						
2-Vinyl Pyridine		X								
3-Chloroperoxybenzoic Acid	X									X(Oxidizer)
3-Mercapto-1,2-propanediol	X									
4-Dimethylamineacazobenzene				X		X (Suspect)				
4-Phenylazodiphenylamine	X									
4-Propylbenzaldehyde Diethyl Acetyl										X(Moisture)
4-Tertbutyl Cyclohexanol							X(Liquid)			
8-Hydroxyquinoline	X									X (Light)
a-Naphtholbenzoin	X									
Acetaldehyde						X(Suspect)	X(Liquid)			
Acetic Acid		X								
Acetic Anhydride		X								
Acetone	X						X (Liquid)			
Acetonitrile							X (Liquid)			
Acetonitrile							X(Liquid)			
Acetophenone	X									
Acetyl Chloride		X					X(Liquid)			
Acetylene Gas								X		
Acrylic Acid		X		X						
Air								X		
Alkali Blue	X									
Alkaline Iodine Reagent		X								
Allyl Acetate					X		X(Liquid)			

MASTER LIST

Chemical Name	Irritant	Corrosive	Sensitizer	Toxic	Highly Toxic	Carcinogen	Flammable Liquid/Solid	Compressed Gas	Explosive	Reactive
Allyl Alcohol					X		X (Liquid)			
Allyl Chloride							X (Liquid)			
Allyl Magnesium Bromide		X					X (Liquid)			
alpha-Naphthylamine	X					X (Suspect)				X (Oxidizer)
Aluminum Ammonium Sulfate	X			X						
Aluminum Chloride		X								
Aluminum Chloride, Anhydrous		X								X (Moisture)
Aluminum Powder							X (Solid)			X (Moisture)
Aluminum Tri Sec Butoxide		X					X (Liquid)			
Aluminum, 1000 ppm Standard		X								
Aluminum, Standard		X								
Ammonia		X								
Ammonium (meta) Vanadate					X					
Ammonium Acetate	X									
Ammonium Bichromate (Dichromate)						X (Suspect)				X (Oxidizer)
Ammonium Bifluoride		X		X						
Ammonium Carbonate	X									
Ammonium Chloride	X									
Ammonium Chromate					X	X				
Ammonium Fluoride		X								
Ammonium Hydrogen Fluoride	X				X					
Ammonium Hydroxide		X		X						
Ammonium Internal Fill Solution	X									
Ammonium Iodide	X									X (Moisture)
Ammonium Iron II Sulfate	X									X (Light)

MASTER LIST

Chemical Name	Irritant	Corrosive	Sensitizer	Toxic	Highly Toxic	Carcinogen	Flammable Liquid/Solid	Compressed Gas	Explosive	Reactive
Ammonium Molybdate	X			X						
Ammonium Nitrate	X									X (Oxidizer)
Ammonium Nitrate	X									X (Oxidizer)
Ammonium Oxalate		X			X					
Ammonium Peroxydisulfate		X								X (Oxidizer)
Ammonium Persulfate		X								X (Oxidizer)
Ammonium Phosphate	X									
Ammonium Thiocyanate	X									
Aniline					X	X (Suspect)				
Anthranilic Acid	X									
Antimony Trichloride		X								
Argon								X		
Argon (Gas)								X		
Aroclor 1254					X					
Arsenic					X	X				
Arsenic Trioxide					X	X				
Arsenic, 1000 ppm Standard					X	X				
Ascarite		X		X						
Barium Chloride					X					
Barium Chloride Dihydrate					X					
Barium Diphenylamine Sulfonate					X					
Barium Hydroxide (Octahydrate)		X			X					
Barium Nitrate				X						X (Oxidizer)
Barium Nitrate				X						X (Oxidizer)
Barium, 1000 Standard		X			X					

MASTER LIST

Chemical Name	Irritant	Corrosive	Sensitizer	Toxic	Highly Toxic	Carcinogen	Flammable Liquid/Solid	Compressed Gas	Explosive	Reactive
Benzaldehyde	X			X						
Benzene						X (Suspect)	X (Liquid)			
Benzolic Acid	X									
Benzoin Oxime										X (Light)
Benzoyl Chloride		X								
Benzoyl Peroxide									X (Heated)	X (Oxidizer)
Benzyl Amine		X								
Benzyl Triethyl Ammonium Chloride	X									
Boric Acid	X									
Boron Trifluoride Etherate		X								X (Moisture)
Bromine					X					X (Oxidizer)
Bromo Benzene B5	X									
Bromoethane	X						X (Liquid)			
Brucine Sulfate	X				X					
Buffer Solution pH 4.00	X									
Buffer Solution, Phosphate pH-7	X									
Butanol	X						X (Liquid)			
Butyl Acrylate	X									
Butyl Alcohol, Iso	X						X (Liquid)			
Butyl Alcohol, Normal	X						X (Liquid)			
Butyl Lithium							X (Liquid)			X (Moisture)
Butyl Magnesium Chloride							X (Liquid)			X (Moisture)
Butylamine		X					X (Liquid)			
Butyraldehyde		X					X (Liquid)			
Butyric Acid		X		X						

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MASTER LIST

Chemical Name	Irritant	Corrosive	Sensitizer	Toxic	Highly Toxic	Carcinogen	Flammable Liquid/Solid	Compressed Gas	Explosive	Reactive
Chloroform					X	X (Suspect)				
Chloromethane							X (Liquid)			X (Moisture)
Chlorotrimethyl Silane		X					X (Liquid)			
Choline Hydroxide	X	X								
Chromic Acid Cleaning Solution					X	X (Suspect)				
Chromium (VI) Oxide					X	X (Suspect)				
Chromium Powder	X			X		X				
Chromium Trioxide					X	X				
Chromium, 1000 ppm Standard	X			X		X				
Citric Acid	X		X							
Cobalt Chloride	X			X						
Congo Red				X						
Copper (I) Bromide	X									X (Light)
Copper (I) Chloride				X						X (Moisture)
Copper Acetate Hydrate	X									
Copper Chloride				X						X (Moisture)
Copper Powder	X						X (Solid)			
Copper Standard Solution	X									
Copper Sulfate	X			X						
Copper Sulfate Pentahydrate										
Copper, Standard 1000 ppm	X			X						
Cresol		X			X					
Cresol Para		X			X					
Crotyl Alcohol							X (Liquid)			
Cupferron				X		X (Suspect)				

MASTER LIST

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MASTER LIST

Chemical Name	Irritant	Corrosive	Sensitizer	Toxic	Highly Toxic	Carcinogen	Flammable Liquid/Solid	Compressed Gas	Explosive	Reactive
Dimethylsulfoxide	X									
Diphenyl Silane	X									
Diphenylamine	X			X						
Diphenylcarbazone	X									
Dipropylamine		X					X(Liquid)			
Sodium EDTA	X									
Sodium EDTA Powder	X									
Sodium Ethylenediamine Tetraacetate	X									
EDTA Sodium Salt - Dihydrate	X									
Erichrome Black T	X									
Ethanolamine		X		X						
Ethoxyethanol	X									
Ethyl 3-3 Dimethyl Acrylate							X(Liquid)			
Ethyl Acetate	X						X (Liquid)			
Ethyl Acetate	X						X(Liquid)			
Ethyl Alcohol				X			X (Liquid)			
Ethyl Aluminum Dichloride							X(Liquid)			X(Moisture)
Ethyl Benzoate	X									
Ethyl Cyanoacetate	X						X(Liquid)			
Ethyl Ether	X						X (Liquid)		X	
Ethyl Formate							X(Liquid)			X(Moisture)
Ethyl Magnesium Bromide							X(Liquid)			X(Moisture)
Ethyl Magnesium Chloride							X(Liquid)			X(Moisture)
Ethyl Piccolinate	X						X(Liquid)			X(Moisture)
Ethylene Diamine Tetraacetate	X									

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MASTER LIST

Chemical Name	Irritant	Corrosive	Sensitizer	Toxic	Highly Toxic	Carcinogen	Flammable Liquid/Solid	Compressed Gas	Explosive	Reactive
Glutaric Anhydride	X									X (Moisture)
Glycerin (Mist)	X									X (Oxidizer)
Glycerine	X									
Glycerol GR	X									
Glyoxylic Acid		X								
Graphite Powder	X (Nuisance)									
Hafnium Metal							X (Solid)			
Helium - Zero Grade								X		
Heptane							X (Liquid)			
Hexafluorobenzene	X						X (Liquid)			
Hexamethyldisiloxane	X						X (Liquid)			
Hexane	X						X (Liquid)			
Hexanoyl chloride		X								
Hexylamine		X					X (Liquid)			
Hydrazine Dihydrochloride					X	X (Suspect)				
Hydrazine Sulfate					X	X (Suspect)				
Hydrochloric Acid		X		X						
Hydrofluoric Acid		X		X						
Hydrogen							X (Gas)	X		
Hydrogen Peroxide		X							X (Potentially)	X (Oxidizer)
Hydrogen Sulfide					X		X (Gas)			
Hydroquinone	X			X						
Hydroxylamine Hydrochloride		X							X	
Hydroxylamine o-Silicic Acid		X								
Hydroxylamine Sulfate		X		X						

MASTER LIST

Chemical Name	Irritant	Corrosive	Sensitizer	Toxic	Highly Toxic	Carcinogen	Flammable Liquid/Solid	Compressed Gas	Explosive	Reactive
Hydroxylamine Sulfate		X		X						
Indene										X(Light)
Indole				X						
Iodine Solution		X								
Iron (Powder)							X (Solid)			
Iron Sulfate										X (Moisture)
Iron Sulfide										X (Moisture)
Iron, Standard	X									X (Light)
Isatoic Anhydride	X									X (Moisture)
Iso-octane	X									
Isoamyl Alcohol	X						X (Liquid)			
Isobutyraldehyde							X (Liquid)			
Isobutyronitrile					X		X (Liquid)			
Isopentane (2-Methylbutane)	X						X (Liquid)			
Isoprene	X						X (Liquid)			
Isopropanol	X						X (Liquid)			
Isopropyl Alcohol	X						X (Liquid)			
Isopropyl alcohol (2-Propanol)	X						X (Liquid)			
Isopropyl Ether	X						X (Liquid)			
Isovaleraldehyde							X (Liquid)			
Itaconic Acid	X						X (Liquid)			
Kaolin				X						
Karl Fischer Reagent		X					X (Liquid)			
Lanthanum Chloride	X									
Lanthanum Powder							X (Solid)			

MASTER LIST

Chemical Name	Irritant	Corrosive	Sensitizer	Toxic	Highly Toxic	Carcinogen	Flammable Liquid/Solid	Compressed Gas	Explosive	Reactive
Lead, Standard 1000 ppm		X								X (Oxidizer)
Lead Acetate					X	X (Suspect)				
Lead Chromate	X					X (Suspect)				
Lead Nitrate	X									X (Oxidizer)
Lead Oxide	X									X (Oxidizer)
Lead Reference Solution (with HNO3)		X								X (Oxidizer)
Lead Subacetate						X (Suspect)				
Ligroin	X									
Lindane	X				X					
Lithium Aluminum Hydride							X (Liquid)			X (Moisture)
Lithium Carbonate		X								
Lithium Diisopropylamide		X								
Lithium Hydride							X (Solid)			X (Moisture)
Lithium Hydroxide, (Monohydrate)		X								
Lithium Tetraborate, Anhydrous	X									
Lithium Wire							X (Solid)			X (Moisture)
Magnesium Hydroxide		X								
Magnesium Metal							X (Solid)			X (Moisture)
Magnesium Oxide										X (Moisture)
Magnesium Perchlorate										X (Oxid, Moist)
Magnesium Perchlorate (Anhydrous)										X (Oxid, Moist)
Manganese (II) Acetate	X									
Manganese, 1000 ppm Standard (Powder)							X (Solid)			X (Moisture)
Mercuric (II) Iodide	X				X					
Mercuric (II) Sulfate		X			X					

MASTER LIST

Chemical Name	Irritant	Corrosive	Sensitizer	Toxic	Highly Toxic	Carcinogen	Flammable Liquid/Solid	Compressed Gas	Explosive	Reactive
Mercuric Chloride		X			X					
Mercuric Iodide	X				X					
Mercuric Nitrate					X					X (Oxidizer)
Mercuric Thiocyanate					X					X (Moisture)
Mercury	X				X					
Mercury, Standard 1000 ppm	X				X					
Mesityl Oxide							X (Liquid)			
Methanesulfonic Acid		X								
Methanol				X			X (Liquid)			
Methanol Absolute				X			X (Liquid)			
Methylene Chloride	X			X						
Methyl Acetoacetate	X									
Methyl Acrylate							X (Liquid)			
Methyl Anthranilate	X									
Methyl Crotonate	X						X (Liquid)			
Methyl Cyanoacetate	X									
Methyl Cyclopentadiene Dimer						X (Suspect)	X (Liquid)			
Methyl Ethyl Ketone	X			X			X (Liquid)			
Methyl Green	X									
Methyl Isobutyl Ketone	X						X (Liquid)		X	
Methyl Lithium							X (Liquid)			X (Moisture)
Methyl Methacrylate		X					X (Liquid)			
Methyl Pentandiol	X									
Methyl Salicylate	X			X						
Methyl Styrene		X								

MASTER LIST

Chemical Name	Irritant	Corrosive	Sensitizer	Toxic	Highly Toxic	Carcinogen	Flammable Liquid/Solid	Compressed Gas	Explosive	Reactive
Methyl Vinyl Ketone					X		X (Liquid)			
Methyl-3-Mercaptopropionate	X									
Methyl-4-Aminobenzoate	X									
Methylcyclohexane	X						X (Liquid)			
Methylene Blue	X									
Methylene Chloride (Dichloromethane)	X			X		X (Suspect)				
Mineral Spirits	X									
Molybdenum, 1000 ppm Standard (Powder)							X (Solid)			
N,N'-Diphenylbenzidine										X (Light)
N,N-Diphenylbenzidine										X (Light)
N-Butyl Bromide (Bromobutane)	X						X (Liquid)			
n-Heptane							X (Liquid)			
N,N-Dimethyl-p-phenylenediamine Sulfate					X					X (Light)
Naphthalene	X						X (Solid)			
Neo-Cuproline	X									
Nickel (II) Sulfate Hexahydrate				X		X (Suspect)				
Nickel Catalyst						X (Suspect)	X (Solid)			
Nickel Nitrate						Suspect as NI				X (Oxidizer)
Nickel, Standard 1000 ppm (Powder)						X (Suspect)	X (Solid)			
Nitric Acid		X								X (Oxidizer)
Nitroethane	X						X (Liquid)			
Nitrogen								X		
Nitromethane							X (Liquid)			
o-Phenanthroline				X						
o-Toluidine					X	X (Suspect)				

MASTER LIST

Chemical Name	Irritant	Corrosive	Sensitizer	Toxic	Highly Toxic	Carcinogen	Flammable Liquid/Solid	Compressed Gas	Explosive	Reactive
Octyl Alcohol	X									
Octylamine		X			X					
Osmium Tetroxide					X					X (Oxidizer)
Oxalic Acid		X		X						
Oxygen								X		X (Oxidizer)
p,o, or m-Ansiline	X					X (Suspect)				
p-Dimethylaminobenzaldehyde	X									
p-Phenetidine	X									X (Light)
p-Phenylenediamine Dihydrochloride	X			X						
p-Toluenesulfonylhydrazide				X			X (Solid)			
p-Toluic Acid				X						
p-Toluidine					X	X (Suspect)				
Paraffin Oil	X									
Paraformaldehyde	X									X (Moisture)
Pentane	X						X (Liquid)			
Pentane	X						X (Liquid)			
Peracetic Acid									X (Heated)	X (Oxidizer)
Perchloric Acid		X								X (Oxidizer)
Perchloric Acid 85%		X								X (Oxidizer)
Petroleum Ether				X			X (Liquid)			
Phenethylamine		X		X						
Phenol		X			X					
Phenolphthalein C.P. Powder				X						
Phenylarsinic Oxide					X					
Phenylhydrazine					X	X (Suspect)				

MASTER LIST

Chemical Name	Irritant	Corrosive	Sensitizer	Toxic	Highly Toxic	Carcinogen	Flammable Liquid/Solid	Compressed Gas	Explosive	Reactive
Phenyltrimethylammonium tribromide	X									
Phosphate Standard (Buffer)	X									
Phosphomolybdic Acid		X					X (Liquid)			X (Oxidizer)
Phosphoric Acid		X								
Phosphoric Acid		X								
Phosphorous Pentoxide		X								X (Moisture)
Phthalic Anhydride	X									X (Moisture)
Pinacolone							X (Liquid)			
Platinum (II) Chloride	X				X					
Platinum (IV) Chloride	X				X					
Platinum Chloride		X		X						
Polyphosphoric Acid		X								
Potassium Bromide	X									X (Oxidizer)
Potassium Bromine	X									
Potassium Butoxide		X					X (Solid)			
Potassium Chloride	X									
Potassium Chloride Ultrapure Reagent	X									
Potassium Chromate						X (Suspect)				X (Oxidizer)
Potassium Cyanide	X				X					
Potassium Cyanide ACS Grade	X				X					
Potassium Dichromate						X (Suspect)				X (Oxidizer)
Potassium Ferricyanide										X (Light)
Potassium Fluoride		X		X						
Potassium Fluoride, Anhydrous		X		X						
Potassium Hydroxide		X								

MASTER LIST

Chemical Name	Irritant	Corrosive	Sensitizer	Toxic	Highly Toxic	Carcinogen	Flammable Liquid/Solid	Compressed Gas	Explosive	Reactive
Potassium Hydroxide (Volumetric Standard)		X		X			X (Liquid)			
Potassium Iodate	X									X (Oxidizer)
Potassium Iodide	X									X (Moisture)
Potassium Nitrate	X									X (Oxidizer)
Potassium Nitrite				X						X (Oxidizer)
Potassium Perchlorate	X									X (Oxidizer)
Potassium Periodate	X									X (Oxidizer)
Potassium Permanganate	X	X								X (Oxidizer)
Potassium Persulfate	X		X							X (Oxidizer)
Potassium Persulfate	X									X (Oxidizer)
Potassium Tert-Butoxide		X					X (Solid)			X (Oxidizer)
Potassium Thiocyanate Crystals	X									X (Moisture)
Potassium, 1000 ppm Standard							X (Solid)			X (Moisture)
Propane								X (Flammable)		
Propargyl Alcohol					X		X (Liquid)			
Propargyl Chloride							X (Liquid)			
Propene								X (Flammable)		
Propionitrile					X		X (Liquid)			
Propyl Alcohol	X						X (Liquid)			
Propylene Oxide						X (Suspect)	X (Liquid)			
Pyridine	X						X (Liquid)			
Pyrogallol	X			X						
Quinhydrone	X			X						
Quinoline	X									
Ruthenium (II) Chloride		X								

MASTER LIST

Chemical Name	Irritant	Corrosive	Sensitizer	Toxic	Highly Toxic	Carcinogen	Flammable Liquid/Solid	Compressed Gas	Explosive	Reactive
S-Diphenylcarbazone										
Salicylic Acid				X						X (Light)
Selenium				X						X (Moisture)
Selenium, 1000 ppm Standard (Powder)				X						
Sequestrene NA4	X									
Silica							X (Solid)			
Silicon Carbide	X									
Silicon, 1000 ppm Standard (Powder)	X						X (Solid)			
Silicotungstic Acid				X						
Silver Chloride										X (Light)
Silver Chromate						X (Suspect)				X (Oxidizer)
Silver Nitrate					X					X (Oxidizer)
Silver Oxide	X									X (Oxidizer)
Silver Sulfate	X									X (Oxidizer)
Soda Lime		X								
Sodium										
Sodium Aluminate	X			X			X (Solid)			X (Moisture)
Sodium Amide										
Sodium Arsenite/Metaarsenite					X	X (Suspect)	X (Solid)			X (Moisture)
Sodium Azide					X				X (Heated)	
Sodium Bicarbonate										X (Moisture)
Sodium Bisulfate		X								X (Moisture)
Sodium Bisulfite		X								
Sodium Bisulfite		X								
Sodium Borate (Crystal)	X									

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MASTER LIST

Chemical Name	Irritant	Corrosive	Sensitizer	Toxic	Highly Toxic	Carcinogen	Flammable Liquid/Solid	Compressed Gas	Explosive	Reactive
Sodium Silicate		X								
Sodium Silicate Solution		X								
Sodium Sulfate	X									
Sodium Sulfide		X					X (Solid)			
Sodium Sulfite	X									
Sodium Thiosulfate	X									
Sodium Thiosulfate Solution 0.1N	X									
Stannous Chloride		X								
Starch, Solution (Indicator)	X				X					
Stearic Acid	X									
Stoddard Solvent	X						X (Liquid)			
Strontium		X								
Strontium, 1000 ppm Standard										X (Moisture)
Sulfamic Acid	X									
Sulfanilic Acid	X									
Sulfur	X									
Sulfur Dioxide								X		X (Moisture)
Sulfuric Acid		X								X (Oxidizer)
Sulfurous Acid		X		X						
Tantalum Powder	X						X (Solid)			
Tert-Amyl Alcohol				X			X (Liquid)			
Tert-Butyl Methyl Ether	X									
Tert-Butylbenzene							X (Liquid)			
Tert-Butylmagnesium Chloride							X (Liquid)			X (Moisture)
Terbutyl Peroxide							X (Liquid)			X (Oxidizer)

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MASTER LIST

Chemical Name	Irritant	Corrosive	Sensitizer	Toxic	Highly Toxic	Carcinogen	Flammable Liquid/Solid	Compressed Gas	Explosive	Reactive
Triphenylsilane	X									
Tripropylamine				X			X (Liquid)			
Tris (hydroxymethyl)-Aminomethane	X									
Tungsten Powder							X (Solid)			
Tyramine	X									
Uranium Acetate (As Uranium)					X	X				
Uranyl Acetate (Radioactive Poison)										
Urea	X									
Valeronitrile			X							
Valeryl Chloride		X					X (Liquid)			
Vanadium Pentoxide (As Vanadium)	X				X					
Vanadium, 1000 ppm Standard (Powder)	X									
Vinylmagnesium Bromide							X (Liquid)			X (Moisture)
Vinylmagnesium Chloride							X (Liquid)			X (Moisture)
Xylene	X			X			X (Liquid)			
Xylene	X						X (Liquid)			
Zinc Acetate	X									
Zinc Acetate	X									
Zinc Chloride	X			X						
Zinc Dust							X (Solid)			X (Moisture)
Zinc Metal							X (Solid)			X (Moisture)
Zinc Nitrate (Hydrate)		X								X (Oxidizer)
Zinc Sulfate	X									

Limits Master List

Chemical Name	ACGIH			OSHA		
	TLV-TWA		STEL	PEL		Celling
	ppm	mg/m3	ppm	mg/m3	ppm	mg/m3
1,1,1-Trichloroethane (Skin)	350	1910	450	2460	350	1900
1,1,2-Trichloroethane (Skin)	10	55			10	45
1,3-Butadiene	10	22				
1,4-Dioxane (Skin)	25	90			25	90
1-Nitropropane	25	91			25	90
1-Propanol (Skin)	200	492	250	614	200	500
2-Ethoxy Ethanol (Skin)	5	18				
4-Dimethylamineazobenzene (Skin)	0.5	2.5			2	10
Acetaldehyde	100	180	150	270	100	180
Acetic Acid	10	25	15	37	10	25
Acetic Anhydride	5	21				
Acetone	750	1780	1000	2380	750	1800
Acetonitrile	40	67	60	101	40	70
Acetonitrile	40	67	60	101	40	70
Acrylic Acid (Skin)	2	5.9			10	30
Allyl Alcohol (Skin)	2	4.8	4	9.5	2	5
Allyl Chloride	1	3	2	6	1	3
Aluminum Oxide		10				
Aluminum Oxide (As Al)		10				
Aluminum Powder (Respirable Fraction)					5	
Aluminum Powder (Total Dust)		10			15	
Ammonia	25	17	35	24		
Ammonium Chloride (Fume)		10		20		
Aniline (Sy)	2	7.6			2	8

Limits Master List

Chemical Name	ACGIH			OSHA		
	TLV-TWA	STEL	PEL	STEL	Celling	
	ppm	mg/m3	ppm	mg/m3	ppm	mg/m3
Antimony Trichloride ***	0.5		0.5			
Arsenic		0.2	0.5			
Arsenic Trioxide ***		0.2	0.5			
Arsenic, 1000 ppm Standard		0.2	0.5			
Barium Chloride (As Soluble Ba Compounds)		0.5	0.5			
Barium Hydroxide (As Soluble Compound) ***		0.5	0.5			
Barium Nitrate (As Soluble Compound) ***		0.5	0.5			
Barium Nitrate (Soluble Compounds) ***		0.5	0.5			
Barium, 1000 ppm Standard		0.5	0.5			
Benzene	10	32	10		25	
Benzoyl Peroxide		55	5			
Bromine	0.1	0.66	0.1	0.3	2	
Butyl Acrylate	10	52	10	55		
Butylamine (Skin)	5	15			5	15
Cadmium (Dusts & Salts)		0.05		0.2	0.6	
Cadmium (Fume)				0.1	0.3	
Cadmium 32 (Cadmium Sulfate, Respirable Fraction)				5		
Cadmium 32 (Cadmium Sulfate, Total Dust)	0.05		15			
Cadmium, Standard 1000 ppm (Dusts & Salts)	0.05		0.2		0.6	
Cadmium, Standard 1000 ppm (Fume)			0.1		0.3	
Calcium Carbonate (Total Dust)	10		15			
Calcium Hydroxide		5	5			
Calcium Oxide		2	5			
Camphor (Synthetic)	2	12	3	2		

*** = Values refer to elemental compound

Limits Master List

Chemical Name	ACGIH			OSHA		
	TLV-TWA		STEL	PEL		STEL
	ppm	mg/m3	ppm	mg/m3	ppm	mg/m3
Carbon Disulfide (Skin)	10	31		4	12	36
Carbon Monoxide	50	57	400	35	40	
Carbon Tetrachloride (Skin)	5	31		2	12.6	
Chloroacetyl Chloride	0.05	0.23	0.15	0.05	0.2	
Chlorine	0.5	1.5	1	0.5	1.5	3
Chloroform	10	49		2	9.78	
Chromic Acid Cleaning Solution ***		0.05				
Chromium (Metal) ***		0.5			1	
Chromium (VI) (Insoluble Compounds) ***		0.05				
Chromium Powder (Metal)		0.5			1	
Chromium Trioxide ***		0.5			0.5	
Chromium VI (Water Insoluble)		0.05				
Chromium VI (Water Soluble)		0.05				
Chromium, 1000 ppm Standard		0.5			0.5	
Copper (Dust & Mist)		1			1	
Copper (Fume)		0.2			0.1	
Copper (I) Bromide (Dusts & Mist) ***		1			1	
Copper (I) Bromide (Fume) ***		0.2			0.1	
Copper (I) Chloride (Dusts & Mist) ***		1			1	
Copper (I) Chloride (Fume) ***		0.2			0.1	
Copper Acetate Hydrate (Dusts & Mist) ***		1			1	
Copper Acetate Hydrate (Fume) ***		0.2			0.1	
Copper Chloride (Dust & Mist) ***		1			1	
Copper Chloride (Fume) ***		0.2			0.1	

*** Values refer to elemental compound

Limits Master List

Chemical Name	ACGIH			OSHA		
	TLV-TWA		STEL	PEL		STEL
	ppm	mg/m3	ppm	mg/m3	ppm	mg/m3
Copper Powder (Dusts & Mists)		1		1		
Copper Powder (Fumes)		0.2		0.1		
Copper Sulfate (Dust & Mists) ***		1		1		
Copper Sulfate (Fume) ***		0.2		0.1		
Copper, Standard 1000 ppm (Dusts & Mists)		1		1		
Copper, Standard 1000 ppm (Fumes)		0.2		0.1		
Cresol (All Isomers, Skin)	5	22		5	22	
Cresol (Skin)	5	22		5	22	
Cupric Oxide (Dust & Mist) ***		1		1		
Cupric Oxide (Fume) ***		0.2		0.1		
Cupric Sulfate (Dusts & Mist) ***		1		1		
Cupric Sulfate (Fume) ***		0.2		0.1		
Cuprous Chloride (Dust & Mist) ***		1		1		
Cuprous Chloride (Fume) ***		0.2		0.1		
Cuprous Oxide (Dust & Mist) ***		1		1		
Cuprous Oxide (Fume) ***		0.2		0.1		
Cyclohexane	300	1030		300	1050	
Cyclohexanol (Skin)	50	206		50	200	
Cyclohexanone	25	100		25	100	
Dicyclopentadiene	5	27		5	30	
Diisopropylamine (Skin)	5	21		5	20	
Dimethyl Sulfate (Skin)	0.1	0.52		0.1	0.5	
Dimethylamine	10	18		10	18	
Dimethylformamide (Skin)	10	30		10	30	

*** Values refer to elemental compound

Limits Master List

Chemical Name	ACGIH			OSHA		
	TLV-TWA		STEL	PEL		CEILING
	ppm	mg/m3	ppm	mg/m3	ppm	mg/m3
Dioxane	25	90		25	90	
Diphenylamine		10				
Ethanolamine	3	7.5	6	3	8	15
Ethyl Acetate	400	1440		400	1400	
Ethyl Acetate	400	1440		400	1400	
Ethyl Alcohol	1000	1880		1000	1900	
Ethyl Ether	400	1210	500	400	1200	1500
Ethyl Formate	100	303		100	300	
Ethylene Glycol (Vapor & Mist)	50 Ceiling	127 Ceiling				
Ethylene Glycol Monomethyl Ether (Skin)	5	16				50
Ethylene Oxide	1	1.8				125
Ethylenediamine	10	25		10	25	
Formaldehyde	1	1.2	2	3		5
Formic Acid	5	9.4		5	9	
Glycerin Mist (Total Dust/Particulate)		10			10	
Graphite (Total Dust/Particulate, Natural)		2.5			2.5	
Graphite (Total Dust/Particulate, Synthetic)		10			10	
Halnium		0.5			0.5	
Heptane (n-Heptane)	400	1640	500	400	1600	2000
Hexane	50	176		50	180	
Hydrogen Chloride (Gas)	5 Ceiling	7.5 Ceiling				5
Hydrogen Fluoride (Gas)	3 Ceiling	2.6 Ceiling		3	6	7
Hydrogen Peroxide	1	1.4		1	1.4	
Hydrogen Sulfide	10	14	15	10	15	20

Limits Master List

Chemical Name	ACGIH			OSHA		
	TLV-TWA		STEL	PEL		Celling
	ppm	mg/m3	ppm	mg/m3	ppm	mg/m3
Hydroquinone		2		2		
Indene	10	48		10	45	
Iodine	0.1 Ceiling	1 Ceiling				0.1
Iron Sulfide ***		1		1		
Iron, Standard (Soluble As Fe)		1				
Isoamyl Alcohol	100	361	125	452	125	450
Isopropanol	400	983	500	1230	400	980
Isopropyl Alcohol	400	983	500	1230	400	980
Isopropyl Alcohol (2-Propanol)	400	983	500	1230	400	980
Isopropyl Ether	250	1040	310	1300	500	2100
Kaolin (Total Dust)		10			10	
Kaolin (Respirable Fraction)					5	
Lead Acetate (Inorganic Dusts & Fumes) ***		0.15				
Lead Acetate ***		0.15				
Lead Chromate		0.05				
Lead Oxide (Inorganic Dusts & Fumes) ***		0.15				
Lead Reference Solution (Fumes) ***		0.15				
Lead Subacetate ***		0.15				
Lead, Standard 1000 ppm		0.15				
Lindane (Skin)		0.5			0.5	
Lithium Hydride		0.025			0.025	
Magnesium Oxide (Respirable Fraction)					5	
Magnesium Oxide (Total Dust & Fume)		10			10	
Manganese (Dust & Compounds)		5			5	5

***=Values refer to elemental compound

Limits Master List

Chemical Name	ACGIH			OSHA		
	TLV-TWA	STEL	PEL	STEL	CEILING	
	ppm	mg/m3	ppm	mg/m3	ppm	mg/m3
Manganese (Fume)	1	3	1	3		
Manganese (III) Acetate (Dust & Compounds) ***	5					5
Manganese (III) Acetate (Fume)***	1	3	1	3		
Mercuric Chloride (See Mercury)						
Mercuric Iodide (See Mercury)						
Mercuric Nitrate (Aryl & Inorganic Hg Compounds) ***	0.1				0.1	
Mercury	0.05		0.05			
Mercury (Alkyl Compounds, Skin)	0.01	0.03	0.01	0		
Mercury (Aryl & Inorganic Compounds, Skin)	0.1					0.1
Mercury (Except Alkyl Vapor, Skin)	0.05		0.05			
Mercury (Skin, Alkyl Compounds)	0.01	0.03	0.01	0.03		
Mercury (Skin, Aryl & Inorganic Compounds)	0.1					0.1
Mercury (Skin, Except Alkyl Vapor)	0.05		0.05			
Mercury Chloride (See Mercury)						
Mercury, Standard (Skin, Alkyl Compounds)	0.01	0.03	0.01	0.03		0.1
Mercury, Standard (Skin, All Forms Except Alkyl Vapor)	0.05		0.05			0.1
Methyl Oxide	15 60	25 100	15 60	25 100		
Methanol (Skin)	200 262	250 328	200 260	250 310		
Methyl Acetate	200 606	250 757	200 610	250 760		
Methyl Acrylate (Skin)	10 35		10 35			
Methyl Ethyl Ketone	200 590	300 885			0.7	5
Methyl Isobutyl Ketone	50 205	75 307	50 205	75 300		
Methyl Methacrylate	100 410		100 410			
Methyl Silane	50 242	100 483	50 240	100 485		

Limits Master List

Chemical Name	ACGIH			OSHA		
	TLV-TWA		STEL	PEL		Ceiling
	ppm	mg/m3	ppm	mg/m3	ppm	mg/m3
Methylcyclohexane	400	1610		400	1600	
Methylene Chloride	50	174				
Methylene Chloride (Dichloromethane)	50	174				1000
Molybdenum (Insoluble, Respirable Fraction)				5		
Molybdenum (Insoluble, Total Dust)		10		10		
Molybdenum (Soluble)		5		5		
n-Butyl Alcohol (Skin)	50 Ceiling	152 Ceiling				50
n-Heptane	400	1640	500	2050	400	1600
n-Propyl Alcohol (Skin)	200	492	250	614	200	500
Naphthalene	10	52	15	79	10	50
Nickel (Insoluble Compounds)		0.05				
Nickel (Metal)		0.05			1	
Nickel (Soluble Compounds)		0.05			0.1	
Nickel Catalyst (Insoluble As Ni) ***		1			1	
Nickel Catalyst (Soluble As Ni) ***		0.1			0.1	
Nickel Nitrate (See Nickel Catalyst) ***						
Nickel, Standard Powder (Soluble)		0.1			0.1	
Nitric Acid	2	5.2	4	10	2	5
Nitroethane	100	307			100	310
Nitromethane	20	50			100	250
o-p-Ansidine (Skin)	0.1	0.5				0.5
o-Toluidine (Skin)	2	8.8			5	22
Osmium Tetroxide	0.0002	0.0016	0.0006	0.0047	0.0002	0.002
Oxalic Acid		1		2		1
						2

***=Values refer to elemental compound

Limits Master List

Chemical Name	ACGIH			OSHA		
	TLV-TWA		STEL	PEL		CEILING
	ppm	mg/m3	ppm	mg/m3	ppm	mg/m3
P-Toluidine (Skin)	2	8.8		2	9	
Paraffin Wax (Fume)	2			2		
Pentaerythritol (Respirable Fraction)	10			10		
Pentane	600	1770	750	600	1800	2250
Pentane	600	1770	750	600	1800	2250
Phenol (Skin)	5	19		5	19	
Phenylhydrazine (Skin)	5	22	10	5	20	45
Phosphate Standard (Buffer)	0.3	0.42				
Phosphoric Acid	1		3	1		3
Phosphoric Acid	1		3	1		3
Phthalic Anhydride	1	6.1		1	6	
Platinum (II) Chloride ***		0.002			0.002	
Platinum (IV) Chloride ***		0.002			0.002	
Platinum (IV) Oxide *** (Metal)	1			1		
Platinum (IV) Oxide *** (Soluble Salts)		0.002			0.0002	
Platinum Chloride ***		0.002			0.002	
Potassium Hydroxide	2 Ceiling					2
Propane				1000	1800	
Propargyl Alcohol (Skin)	1	2.3		1	2	
Propylene Oxide	20	48		20	50	
Pyridine	5	16		5	15	
Sec-Butyl Alcohol	100	303		100	305	
Selenium		0.2			0.2	
Selenium Standard		0.2			0.2	

***Values refer to elemental compound

Chemical Name	ACGIH			OSHA		
	TLV-TWA		STEL	PEL		Celling
	ppm	mg/m ³	ppm	mg/m ³	ppm	mg/m ³
Silica (Respirable Dust)		0.05		10		
Silicon Carbide (Total Dust)		10		30		
Silicon, 1000 ppm (Respirable Fraction)				5		
Silicon, 1000 ppm (Total Dust)		10		10		
Silver Chromate (As Soluble Compound) ***		0.01		0.01		
Silver Nitrate (As Ag, Soluble) ***		0.01		0.01		
Silver Oxide (See Silver Nitrate)						
Silver, 1000 ppm Standard (Metal)		0.1		0.01		
Sodium Azide		0.11 Ceiling 0.29 Ceiling			0.1	
Sodium Bisulfite		5		5		
Sodium Disulfite		5		5		
Sodium Hydroxide		2 Ceiling				2
Sodium Metabisulfide		5		5		
Sodium Metabisulfite		5		5		
Starch (Respirable Fraction)				5		
Starch (Total Dust)		10		15		
Stoddard Solvent	100	525		100	525	
Styrene, Monomer (Skin)	50	213	100	50	215	100 425
Sucrose, Crystals (Respirable Fraction)				5		
Sucrose, Crystals (Total Dust)		10		15		
Sulfur Dioxide	2	5.2	5	2	5	5 10
Sulfuric Acid		1		1		
Tantalum (Metal & Oxide Dust)		5		5		
Tetrachlorethane (Skin)	1	6.9		1	7	

***=Values refer to elemental compound

Limits Master List

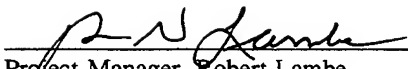
Chemical Name	ACGIH			OSHA		
	TLV-TWA		STEL	PEL		CEILING
	ppm	mg/m3	ppm	mg/m3	ppm	mg/m3
Tetrahydrofuran	200	590	250	737	200	590
Thionyl Chloride	1	4.9			250	735
Tin (IV) Chloride *** (Oxide & Inorganic Compounds)	2					
Tin Powder	2			2		
Titanium Dioxide (Respirable Fraction)				5		
Titanium Dioxide (Total Dust)	10			10		
Toluene	100	377	150	565	100	375
Trichloroacetic Acid	1	6.7		1	1	
Triethylamine	10	41	15	62	10	40
Triethylamine	10	41	15	62	10	40
Tungsten Powder (Insoluble)	5			10		
Tungsten Powder (Soluble)	1		3		1	3
Uranium (Insoluble Compounds)	0.2		0.6		0.2	0.6
Uranium (Soluble)	0.2		0.6		0.05	
Vanadium (Dust And Fume)	0.05			0.05		
Xylene	100	434	150	651	100	435
Xylene (o,m,p-, isomers)	100	434	150	651	100	435
Zinc Chloride (Fume)	1		2		1	2

Final Health and Safety Plan

Supplement A

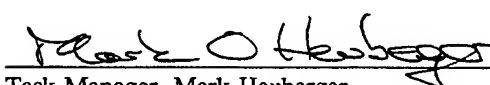
Arthur D Little

**Main Post Site
Investigation (SI)
Fort Devens,
Massachusetts**


Project Manager, Robert Lambe 8/8/94
Date

Submitted to

**U.S. Army Environmental
Center (USAEC)
Formerly USATHAMA
Aberdeen Proving
Ground, Maryland**


Task Manager, Mark Heuberger 8/5/94
Date

**Revision 2
August 1994**


Program Health and Safety Officer,
Corey W. Briggs CIH,CET 8/8/94
Date

**Arthur D. Little, Inc.
Acorn Park
Cambridge, Massachusetts
02140-2390**

ADL Reference 67064-15



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1.0 Introduction

See Health and Safety Plan.

1.1 Introduction

This Supplement to the Health and Safety Plan (HASP) for Fort Devens, Massachusetts has been prepared to address task specific activities associated with the following task:

- Main Post Site Investigation
- Main Post Supplemental Site Investigation and RI/FS (Modification 2 to Task 0004)

The overall Health and Safety activities for all Arthur D. Little activities at Fort Devens are contained in the Final HASP for Fort Devens, Massachusetts, dated June 16, 1993. Supplements to the HASP address task-specific activities. Specifically, this supplement follows the same organizational format as the HASP and provides additional information for new activities or procedures for the specific tasks. Additionally, Supplement A provides site-specific health and safety plans (included as Appendix D). Reference is made to the Final HASP and other supplements for all other health and safety activities and procedures.

2.0 Staff, Organization, and Responsibilities

2.1 Project Staff and Health and Safety Organization

The personnel and their organizations listed below will be performing various onsite and/or offsite activities (see Figure 2-1A). The USAEC Project Manager will be notified promptly of any potential onsite health and safety problems and changes in the health and safety organization. Telephone numbers are provided in Section 7.8.8 of this plan.

2.1.1 USAEC

- Project Manager: Charles George
- Health and Safety Officer: William P. Houser

2.1.2 Arthur D. Little, Inc.

- Program Manager: Robert Lambe
- Task Manager: Mark Heuberger
- Deputy Task Manager: Erin Healy
- Health and Safety Staff:
 - Corporate Director of Health and Safety (CDHS): R.S. Stricoff, CIH, CSP
 - Project Field Supervisor: Erin Healy
 - Health and Safety Officer (HSO): Corey Briggs, CIH CET
 - Health and Safety Officer, Alternate: Peter Roy, CIH
 - Site Health and Safety Officer (SHSO): Erin Healy
 - Site Health and Safety Officer, Alternates: To be determined
 - Task Health and Safety Officer (THSO): To be determined in the field

2.2 Responsibilities

2.2.1 Task Manager/Deputy Task Manager

See Health and Safety Plan

2.2.2 Project Field Supervisor

See Health and Safety Plan

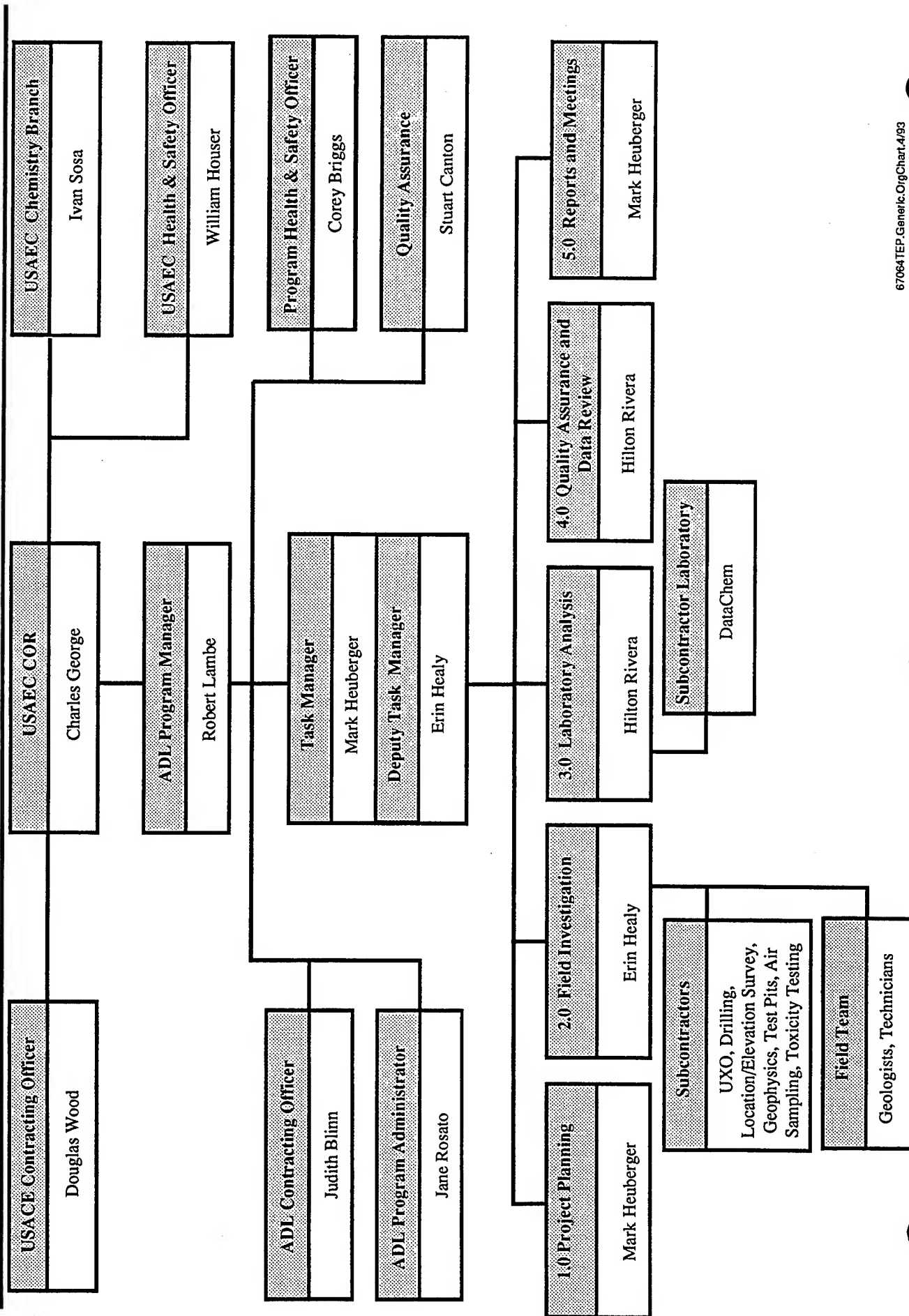
2.2.3 Corporate Director of Health and Safety (CDHS)

See Health and Safety Plan

2.2.4 Health and Safety Staff (HSO and Alternate HSO)

See Health and Safety Plan

Figure 2-1A
Fort Devens Main Post SSL and RI/FS — Organizational Chart



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2.2.5 Site Health and Safety Officer (SHSO)

See Health and Safety Plan

2.2.6 Site Health and Safety Officer - Alternates(s)

See Health and Safety Plan

2.2.7 Task Health and Safety Officer

See Health and Safety Plan

2.2.8 Field Geologists, Sampling Technicians, Chemists, and Field Personnel

See Health and Safety Plan

2.2.9 Subcontract Personnel

See Health and Safety Plan

HASP, Fort Devens:	Supplement A
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Revision No.:	2
Date:	August 1994

3.0 Hazard Communication and Training

3.1 Health and Safety Training

See Health and Safety Plan

3.2 Health and Safety Site Orientation

See Health and Safety Plan

A Pesticides Health and Safety Awareness session will also be conducted for all personnel working on this project. In addition, the UXO subcontractor will provide a UXO/Explosives/Ordnance Awareness training session prior to onsite activities.

3.3 Site Documentation

See Health and Safety Plan

3.4 Health and Safety Briefings

See Health and Safety Plan

3.5 Post-Investigation Health and Safety Briefing

See Health and Safety Plan

3.6 Subcontractor Personnel

See Health and Safety Plan

HASP, Fort Devens: Supplement A
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4.0 Medical Surveillance and Exposure Monitoring

4.1 Medical Surveillance

See Health and Safety Plan

4.2 Exposure Monitoring

See Health and Safety Plan

5.0 Health and Safety Equipment

5.1 Personal Protective Equipment

5.1.1 General

See Health and Safety Plan

5.1.2 Respiratory Protection

See Health and Safety Plan

5.1.3 Maintenance and In-use Inspection of Protective Equipment

See Health and Safety Plan

5.2 Environmental Monitoring Equipment

5.2.1 General

See Health and Safety Plan

5.2.2 Real Time Air Monitoring

See Health and Safety Plan

5.2.3 Perimeter Monitoring

See Health and Safety Plan

5.2.4 Flammable/Combustible Gases

See Health and Safety Plan

5.2.5 Oxygen Deficiency

See Health and Safety Plan

5.2.6 Respirable Dust

See Health and Safety Plan

5.2.7 Calibration and Maintenance

See Health and Safety Plan

5.2.8 Recordkeeping Requirements

See Health and Safety Plan

5.2.9 Heat Stress

See Health and Safety Plan

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5.2.10 Action Levels

Depending on the activities, field work will be conducted in Level D, modified Level D, or Level C personal protection.

See Health and Safety Plan

5.2.10.1 Chemical Vapors. Action levels and the appropriate action are summarized below.

See Health and Safety Plan

5.2.10.2 Explosive Limit Detection.

See Health and Safety Plan

5.2.10.3 Oxygen Deficiency.

See Health and Safety Plan

5.2.10.4 Radiation Detection.

See Health and Safety Plan

5.3 Emergency Equipment

See Health and Safety Plan

6.0 Background, Site Location, and Site Description

6.1 Background

See Health and Safety Plan

6.2 Site Location and Description

See Health and Safety Plan

Figure 6-1A shows the location of the Main Post Study Areas within Fort Devens.

6.3 Site-specific Actions

6.3.1 Main Post SI

The study areas at Fort Devens have been organized into 13 groups: Groups 1A, 1B, and 2 through 12. This task order addresses Group 4, 8, and 9 study areas along with the Nashua River Study. The study areas addressed by the Main Post SI task order are as follows:

Group	Site Number	Site Name
4	33	DEH Entomology Shop (Bldg. 262)
	34	Former DEH Entomology Shop at Bldg. 245
	35	Former DEH Entomology Shop at Bldg. 254
	36	Former DEH Entomology Shop at Bldg. 272B
	37	Golf Course Entomology Shop (Bldg. 3622)
8	16	Shoppette Debris Disposal Area
	17	Little Mirror Lake
	29	Transformer Storage Area
	39	Transformer Near Bldg. 4250 (Sylvania Bldg.)
9	10	Construction Debris Area #1
	11	Construction Debris Area #2
--	NR	Nashua River Study

6.3.2 Main Post SSI and RI/FS

Site Investigations were conducted by Arthur D. Little at thirteen study areas (SAs) as part of the Main Post SI. The background, investigation results, preliminary risk evaluation, and conclusions and recommendations for each SA are described in the Main Post Site Investigation Report. Supplemental SIs have been recommended at four SAs: SA-17 (Mirror Lake and Little Mirror Lake), SA-39 (Sylvania Building Site), and SA-51 (O'Neill Building Site). Supplemental SI activities were also recommended for Building 3606 at SA-37 (Golf Course Entomology Shops). A remedial investigation/feasibility study has been recommended for SA-11, construction Debris Area, which has been designated as Area of Concern (AOC) 11. The primary objectives of the Fort Devens Main Post SSI are as follows:

- To conduct Supplemental Site Investigations (SSI) at four SAs to assess the presence of environmental contamination
- To evaluate the SSI data to determine which sites:
 - Require no further action
 - Are candidates for removal action
 - Require inclusion in a remedial investigation and feasibility study (RI/FS)

The primary objectives of the RI/FS for AOC-11 are as follows:

- The objective of the remedial investigation (RI) at AOC-11 is to provide data regarding the physical characteristics of the area, the nature and extent of contamination, and contaminant fate and transport. The RI will also provide data necessary to complete the Baseline Human Health and Ecological Risk Assessment and the Feasibility Study.
- The objectives of the Baseline Risk Assessment (BRA) are to assess and quantify the potential human health and ecological risks resulting from site-derived contaminants in all media, and to identify those areas requiring remediation.
- The objective of the Feasibility Study (FS) is to develop and evaluate a range of remedial alternatives to address volumes or areas of contamination. The developed alternatives will be effective for all contaminants and media of interest. The FS will also provide a comparative analysis of alternatives with respect to nine criteria as required under CERCLA.

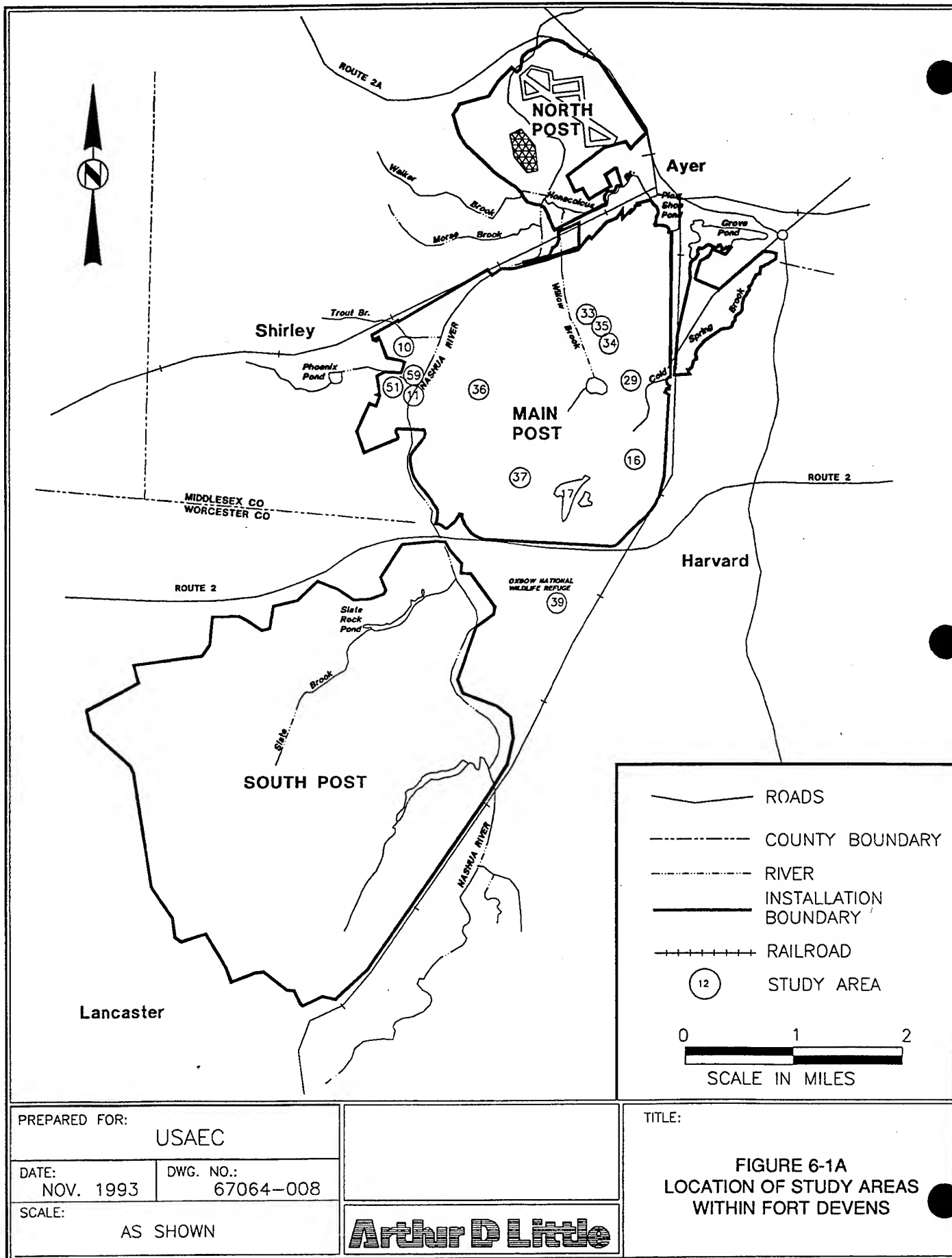
Figure 6-1A indicates the locations of the study areas within Fort Devens.

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The Supplemental SI and RI field investigations will include the tasks listed below.

- Utility clearance for all subsurface exploration locations
- Unexploded ordnance (UXO) clearance, as appropriate
- Wetland delineation and assessment
- Location and elevation survey
- Surveys for metal objects
- Test pit excavation
- Soil borings and subsurface soil sampling
- Ground water monitoring well installation
- Monitoring well development
- Ground water sampling
- Geoprobe ground water and soil sampling
- Surface water and sediment sampling
- Ground water and surface water level measurement
- Ambient air and particulate sampling

The sampling objectives, sampling location and frequency, and sample designation for field investigations at each study area are presented in detail in the Supplemental Work Plan.



PREPARED FOR:

USAEC

DATE:

NOV. 1993

DWG. NO.:

67064-008

SCALE:

AS SHOWN

Arthur D Little

TITLE:

**FIGURE 6-1A
LOCATION OF STUDY AREAS
WITHIN FORT DEVENS**

HASP, Fort Devens: Supplement A
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Revision No.: 2
Date: August 1994

7.0 Health and Safety Procedures

7.1 Site-Specific Health and Safety Plan

See Health and Safety Plan

7.2 Work Zones and Site Control

See Health and Safety Plan

7.2.1 Work Zones

See Health and Safety Plan

7.2.2 Exclusion Zones

See Health and Safety Plan

7.2.3 Contamination Reduction/Decontamination Zones

See Health and Safety Plan

7.2.4 Support Zone

See Health and Safety Plan

7.2.5 Site Entry and Exit

See Health and Safety Plan

7.2.6 Site Access and Parking

See Health and Safety Plan

7.2.7 Buddy System

See Health and Safety Plan

7.3 Environmental Monitoring

See Health and Safety Plan

7.4 Safe Work Practices

7.4.1 General

See Health and Safety Plan

7.4.2 Daily Start-up and Shutdown Procedures

See Health and Safety Plan

7.4.3 Confined Space Entry

See Health and Safety Plan

7.4.4 Tanks, Drums, and Barrels

See Health and Safety Plan

7.4.5 Accident Prevention Plan

See Health and Safety Plan

7.5 Site Entry Procedures

See Health and Safety Plan

7.6 Decontamination

7.6.1 Exclusion and Decontamination Zones

See Health and Safety Plan

7.6.2 Decontamination Procedures

See Health and Safety Plan

7.6.2.1 Partial Decontamination. See Health and Safety Plan

7.6.2.2 Complete Decontamination. See Health and Safety Plan

7.6.3 Decontamination Notice to Emergency Personnel

See Health and Safety Plan

7.6.4 Equipment Decontamination

See Health and Safety Plan

7.6.5 Disposal of Wastes During Investigative Activities

See Health and Safety Plan

7.7 Communications and Equipment

See Health and Safety Plan

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7.8 Emergency Action Plan

See Health and Safety Plan

7.8.1 Pre-Emergency Planning

See Health and Safety Plan

7.8.2 Emergency Recognition and Prevention

See Health and Safety Plan

7.8.3 Emergency Equipment

See Health and Safety Plan

7.8.4 Operations Shutdown

See Health and Safety Plan

7.8.5 Fire and Explosion Response Procedures

See Health and Safety Plan

7.8.6 Spills, Releases, Leaks of Hazardous Materials

See Health and Safety Plan

7.8.7 Evacuation from Work Zones

See Health and Safety Plan

7.8.8 Emergency Telephone Numbers

See Health and Safety Plan

Other Important Numbers

See Health and Safety Plan

Arthur D. Little, Inc.

(617) 498-5000 (Main Number)

Mark Heuberger (Task Manager) x6131

Corey Briggs, CIH (HSO) x6106

Peter Roy, CIH (AHSO) x6112

Chris Martel, CHP (RSO-Radiation) x6103

R.S. Stricoff, CIH, CSP (CHSO) x5884

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7.8.8.1: Site-Specific Directions to Deaconess Nashoba Hospital. Cutler Army Hospital at Fort Devens should not be used for hospital emergencies. Deaconess Nashoba Hospital in Ayer, Massachusetts should be used for hospital emergencies. Directions to the hospital are posted in the Arthur D. Little field office and provided to all field personnel.

Directions to Deaconess Nashoba Hospital:

Exit Fort Devens at Verbeck Gate
Right on Main Street
Left on Washington Street (located in center of town)
Continue 2 miles - Washington Street becomes Groton Road
Hospital will be on the left

7.8.9 Reporting Incidents

7.8.9.1 Large-Scale Incidents. See Health and Safety Plan

7.8.9.2 Accidents, Injuries, Illnesses. See Health and Safety Plan

7.9 First Aid Emergency Procedures

7.9.1 Chemical Exposures

See Health and Safety Plan

8.0 Site Hazard Summary

See Health and Safety Plan

8.1 Unexploded Ordnance (UXO)

Examples of sites where UXO screening will need to be performed include, but may not be limited to, the following:

- Sylvania Building (SA-39)
- Little Mirror Lake (SA-17); and
- Construction Debris Area (AOC-11).

UXO services that will be provided by Arthur D. Little's subcontractor include three components: 1) attendance at the scheduled Pre-Drilling Site Visit (Subtask 1.2) and subsequent recommendations regarding UXO hazards for inclusion in the development of the Final Health and Safety Plan; 2) inspection of Little Mirror Lake for UXO; and 3) surface clearance and downhole UXO clearance during completion of soil borings at SA 39.

8.2 Chemical and Radioactive Hazards

See Health and Safety Plan

8.3 Physical Hazards

See Health and Safety Plan

8.3.1 Abatement of Physical Hazards

See Health and Safety Plan

8.3.2 Fire/Explosion

See Health and Safety Plan

8.3.3 Buried Utility Lines

See Health and Safety Plan

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Date:	August 1994

8.3.4 Drilling

See Health and Safety Plan

8.3.5 Sampling

See Health and Safety Plan

8.3.6 Excavation Safety

See Health and Safety Plan

8.3.7 Aquatic Activities

See Health and Safety Plan

8.4 Environmental Hazards

8.4.1 General

See Health and Safety Plan

8.4.2 Insect/Pest Hazards

See Health and Safety Plan

8.4.3 Heat Stress Hazards

See Health and Safety Plan

8.4.4 Cold Stress Hazards

See Health and Safety Plan

8.5 Initial and Continued Site Evaluation

See Health and Safety Plan

HASP, Fort Devens: Supplement A
Section No.: Appendix A
Revision No.: 1
Date: June 16, 1993

Appendix A: Health and Safety Training Requirements

See Health and Safety Plan

HASP, Fort Devens: Supplement A
Section No.: Appendix B
Revision No.: 1
Date: June 16, 1993

Appendix B: Medical Monitoring Requirements

See Health and Safety Plan

Appendix C: Accident Prevention Plan

1.0 Responsibilities

See Health and Safety Plan

2.0 Training

See Health and Safety Plan

3.0 General Safety Precautions

See Health and Safety Plan

4.0 Sanitation

See Health and Safety Plan

5.0 Fire Prevention

See Health and Safety Plan

6.0 Housekeeping

See Health and Safety Plan

7.0 Individual Protective Equipment

See Health and Safety Plan

8.0 Tools

See Health and Safety Plan

9.0 Powered Equipment

See Health and Safety Plan

10.0 Hazardous and Toxic Materials

See Health and Safety Plan

11.0 Emergencies

See Health and Safety Plan

12.0 Accident Reporting, Analysis and Prevention

See Health and Safety Plan

13.0 Site Safety Inspections

See Health and Safety Plan

HASP, Fort Devens: Supplement A
Section No.: Appendix D
Revision No.: 1
Date: June 16, 1993

Appendix D: Site-Specific Health and Safety Plans

**Site-Specific
Health and Safety Plan
Arthur D. Little, Inc.**

This plan is applicable for sites where the work involves unknown or uncharacterized chemical contamination. Please reference the Arthur D. Little Hazardous Waste Operation Health and Safety Program Plan for detail on the overall program. A copy of the most current Arthur D. Little Health and Safety Program Plan for Hazardous Waste Site Operations (April, 1992) and the Fort Devens Main Post Health and Safety Plan shall be available at the site in addition to other applicable documentation.

Job Name Fort Devens Site Investigation **Case No.** 67064

Site Location SA33, DEH Entomology Shop (Bldg. 262)

Site History Current entomology operations at Fort Devens, which include base-wide herbicide and pesticide applications, are based in Building 262. Chemicals are currently stored in this building and mixing of small amounts of chemicals for house hold applications are conducted within the building. Larger scale chemical mixing is conducted along the southern exterior of the building in a 250 gallon Rotomist mobile applicator. Some of the chemicals which may be used at this location include Malathion and Roundup.

Site Description/Nature of Work The proposed scope of work associated with this study area includes: records review; exploratory borings with associated soil samples from three depths per location (0-6 inches, 2-4 feet, 8-10 feet) to evaluate the potential for subsurface infiltration of any chemicals used during entomology operations; surface soil samples collected near the reported exterior chemical mixing area; surface soil samples distributed around the sides of the building to evaluate the potential for additional leaks or spills; and interior wipe samples to evaluate the potential for chemical residues to remain on the floors and walls as a result of chemical mixing and storage operations.

A site plan is provided in the Work Plan for the Fort Devens Main Post SI.

Dig Safe and Other Utilities Notified _____

By Whom _____ **Date** _____

Response _____

File Numbers _____

Primary Level of Protection: Level D+

Contingency Level of Protection: Level C (if dusting and odors are noted and/or action levels are reached).

Emergency Phone Numbers

ADL Health and Safety Office: Primary 800-677-3000 x6106 (C. Briggs), Alternate 800-677-3000 x6112 (P. Roy), Alternate 800-677-3000 x5884 (S. Stricoff)

Ambulance: 769-6911 **Fire:** 796-2220 **Police:** 796-3333

Hospital:

Name Culter Army Hospital

Address Building 3654 - Fort Devens

Hospital Phone Number 796-6911

Attach written directions and a map of the route to the nearest hospital (Attachment 1)

Other: Nashoba Community Hospital **Phone No.** 772-2657

Environmental/H&S - Bill Mullen **Phone No.** 796-3114

Location of Nearest Phone: _____

Site Hazards

Chemical Hazards (overview, include source and location of contaminants):

Organophosphorus pesticides; malathion, RoundupTM, DDT, Kerosene.

Representative Chemicals	PEL/TLV/IDLH
<u>Malathion</u>	<u>10 mg/m³</u>
<u>RoundupTM</u>	<u>--</u>
<u>DDT</u>	<u>1 mg/m³</u>
<u>Kerosene (Fuel Oil)</u>	<u>--</u>

Factors Indicating the Nature of the Potential or Known Contaminants at the Site:

Site History: ☒ _____ **Previous Sampling Results:** _____ **Current Use:** _____

Explain: _____

Major Routes of Exposure: Dermal, and inhalation primarily; ingestion if good hygiene not practiced; potential eye exposure from dust generation; potential injection from cuts caused by sharp objects.

Symptoms of Exposure/Potential Health Effects: See Attachment E

Note: Pesticides and herbicides have characteristic odors but cannot be easily monitored with direct reading instruments. Upgrade a Level of Protection when in doubt.

Physical Hazards

If drilling, the general types of hazards associated with a drill rig are present, namely, slips and falls, falling objects, hand, foot and back injuries, etc. If digging test pits, the additional hazards of a swinging backhole bucket, collapse of excavation, etc., exist.

Noise Hazards

The noise associated with operation of a drill rig or other heavy equipment can cause permanent, irreversible hearing loss. "Impact noise," such as that caused by driving a well point or split spoon with a drill rig hammer, is especially damaging. Proper hearing protection (ear muffs or plugs) must be worn when near a source of loud noise.

Fire Hazards: Solvents used for wipe sampling and equipment documentation; fuel tank of drill rig; underground fuel/gas lines on tanks; hitting buried containers.

Electrical Hazards: Live electrical circuits in building, overhead lines, potential exposed circuit boxes and wires; underground lines.

Oxygen Deficiency: Not anticipated.

Confined Space Entry: Not applicable; ADL prohibited from this type of work.

Radioactive Materials: Not anticipated but a general screening to be conducted.

Other Hazards: Heat stress, cold stress, environmental hazards (e.g., ticks, insects, etc.).

Personnel Health and Safety Requirements

Medical Monitoring Requirements. Site personnel must be participants in ADL's, or similar, medical monitoring program, and must have had their most recent exam within the previous 12 months. The exam must have indicated no medical restrictions that would inhibit personnel from performing the required work tasks.

Training Requirements. All site personnel must have the current 40 hours or 8 hours (refresher) of relevant health and safety training and/or experience which included coverage of hazard recognition, use of site monitoring instruments, use of personal protective equipment, etc. Personnel must also be oriented to the components of this site-specific plan. Attachment A shall be utilized to document training and physical examination records of site personnel. Attachment B shall be used to document orientation to this site-specific plan.

Site Health and Safety Procedures

Procedures for a Site "Walk-Over":

Practice contamination avoidance at all times; do not step in areas of obvious contamination; do not move unlabelled or unknown containers; do not kneel on ground, floor or other potentially contaminated surfaces; all efforts must be made to minimize contaminating clean work areas; wear proper personal protective equipment.

Procedures for Intrusive Site Work: (Drilling, Test Pits, etc.)

A. Personal Protective Equipment:

1. (a) PPE should be used on the site. (See the PPE Checklist attached to this plan; Attachment 2).

(b) Type of Respirator Cartridges: Organic vapor/acid gas/HEPA (GMC-H).

2. Additional Personal Protective Equipment: _____

B. Monitoring Equipment: HNu or Microtip; combustible gas/oxygen meter, Draeger colorimetric tubes. The field log book or Attachment C shall be used to document onsite environmental monitoring.

C. Additional Safety Equipment: _____

D. Health and Safety Work Procedures:

1. Site Briefings: Conduct a daily briefing with site personnel and go over work objectives and the major elements of this plan.

- Tailgate Safety Meeting Form
- In Field Notebook

2. Site Control: Control work areas using any combination of barricade tape, road cones, saw horses, etc. to prohibit the entry of unauthorized personnel; use buddy system.

3. Activity Specific Procedures:

(a) Task(s): Collect surface soil samples using hand auger.

Procedures: Don protective equipment (e.g., Tyvek, gloves, boots, etc.); use good auger handling procedures; do not kneel in potentially contaminated areas; if any odors are noted, upgrade to Level C and conduct air monitoring.

Action Levels: 19.5%-O₂; 10% of LEL; PID-Bkgd = D+; PID-Bkgd to 5 ppm for 5 minutes = C; PID->5 ppm for 5 minutes or peak of 30 ppm or greater-stop operations; RAD->2 mR/hr = stop work; leave area.

3. (b) Task(s): Collect wipe samples from the chemical mixing room.

Procedures: Don protective equipment (e.g., gloves, eye protection; use good wipe sampling procedures; do not kneel in potentially contaminated areas; if any odors are noted, upgrade to Level C and conduct air monitoring.

Action Levels: 19.5%-O₂; 10% of LEL; PID-Bkgd = D+; PID-Bkgd to 5 ppm for 5 minutes = C; PID->5 ppm for 5 minutes or peak of 30 ppm or greater-stop operations; RAD->2 mR/hr = stop work; leave area.

3. (c) Task(s): Collect soil samples from borings.

Procedures: Don protective equipment (e.g., gloves, Styvek coated eye protection; use good drilling and sampling procedures; practice contamination avoidance; periodically monitor the bore hole; if odors are noted, upgrade to Level C and continue to monitor.

Action Levels: 19.5%-O₂; 10% of LEL; PID-Bkgd = D+; PID-Bkgd to 5 ppm for 5 minutes = C; PID->5 ppm for 5 minutes or peak of 30 ppm or greater-stop operations; RAD->2 mR/hr = stop work; leave area.

Other tasks (if applicable) are attached.

4. Personnel and Equipment Decontamination:

- Remove gross contamination from tools, respirator, monitoring equipment, boots, etc. prior to leaving the work-site, using water, paper towels, hand-wipes, etc.
- Either completely decontaminate soiled equipment at the work-site using detergent and water (if possible), or wrap equipment in plastic bag for transport until complete decontamination is possible.
- Always follow established personal decontamination procedures and remove contaminated gloves, Tyvek suits, used cartridges, paper towels, etc. by placing in a plastic bag and arrange for proper disposal.
- Wash hands and face thoroughly with soap and water before lunch or coffee breaks, and as soon as practicable after finishing work for the day.
- Additional Decontamination: Follow decontamination procedures in the program plan if more extensive decontamination is needed.

Emergency Procedures

Personal Injury. If authorized, administer appropriate first aid. The injured may need to be transported to the nearest hospital. If possible, notify hospital in advance of incoming patient and nature of injury. If there is a question about whether it is safe to move the victim, DO NOT move the victim - instead, make him/her as comfortable as possible, and summon emergency assistance.

Chemical Exposure. If site personnel show signs of inhalation exposure, retreat to fresh air for recovery. If symptoms warrant, bring the injured to the nearest hospital for observation, and discontinue work at that location and consult with H&S representative.

In case of skin or eye irritation due to chemical contact, wash affected skin with soap and water, or flush eyes with generous amount of water. If irritation is serious, seek medical attention.

Fire. If the fire can be easily contained and extinguished, do so with a portable fire extinguisher. If explosion risk is present, do not attempt to extinguish - evacuate all personnel to a safe area and call the fire department (796-2220).

Spills. If safe to do so, contain the spill if materials and equipment are available. If these materials are not available or the release is beyond the capabilities of site personnel, contact local emergency responders who are trained and equipped to control and cleanup the release (796-2220).

Important Note: If site observations, sampling results, or any other information indicates the presence of chemical contaminants other than those specified herein, this health and safety plan becomes void, and a new plan must be prepared and approved!

The field logbook or Attachment D shall be completed to document daily health and safety activities in the study areas.

Project Manager _____

Health & Safety Plan Prepared By _____ **Date** _____

Health & Safety Plan Approved By _____ **Date** _____

Arthur D. Little, Inc. PPE Checklist

- ☒ 1. MSA Ultratwin full-face air-purifying respirator, in a protective plastic bag
- ☒ 2. Nose cup insert for MSA Ultratwin respirator
- ☒ 3. Ear-muff set which fits into hardhat
- ☒ 4. Optional: Eyeglass kit for MSA Ultratwin respirator
- ☒ 5. MSA cartridges for respirator OV/AG/HEPA (GMC-H)
- ☒ 6. Protective lenses cover for MSA Ultratwin respirator
- ☒ 7. Disposable ear plugs
- ☒ 8. Silvershield gloves
- ☐ 9. Natural rubber gloves
- ☒ 10. Nitrile gloves
- ☒ 11. Polyethylene Tyvek suit
- ☒ 12. Saranex Tyvek suit
- ☒ 13. Safety glasses with side shields
- ☒ 14. Goggles
- ☒ 15. Plastic disposal bags
- ☒ 16. Hardhat
- ☒ 17. Duct tape
- ☒ 18. Other (list below)
 - Standard Tyvek for hand augering activities.
 - Polyethylene/Saranex coated/Tyvek for drilling.
 - No special body covering for wipe sampling.

Site-Specific Directions to Cutler Army Hospital

Site #33 DEH Entomology Shop (Bldg 262). Go south on Buena Vista to second stop sign (Dakota). Turn right on Dakota and take second left onto Queenstown Street. Hospital is on the left off Queenstown Street.

Site #34 Former DEH Entomology Shop at Bldg 245. Go south on Buena Vista to second stop sign (Dakota). Turn right on Dakota and take second left onto Queenstown Street. Hospital is on the left off Queenstown Street.

Site #35 Former DEH Entomology Shop at Bldg 254. Go south on Buena Vista to second stop sign (Dakota). Turn right on Dakota and take second left onto Queenstown Street. Hospital is on the left off Queenstown Street.

Site #36 Former DEH Entomology Shop at Bldg 272B. Go south on Buena Vista to second stop sign (Dakota). Turn right on Dakota and take second left onto Queenstown Street. Hospital is on the left off Queenstown Street.

Site #37 Golf Course Entomology Shop (Bldg 3622). Turn right onto Patton Road and first right onto Queenstown Street. Hospital is on the left.

Site #16 Shoppette Debris Disposal Area. Follow Patton Road until Queenstown Street appears on left. Take a left onto Queenstown Street. Hospital is to the left.

Site #17 Little Mirror Lake. (Follow Site #16, or) Follow Sheridan Road to Queenstown Street. Take a right onto Queenstown Street. Hospital is on the right.

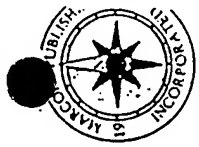
Site #29 Transformer Storage Area. Follow Saratoga Street to Patton Road. Take a right onto Patton Road and a left onto Queenstown Street. Hospital is on the left.

Site #39 Transformer Near Bldg. 4250. Come back under Route 2. Take left onto Sheridan Road and a right onto Queenstown Street. Hospital is on the right.

Site #10 Construction Debris Area #1. Follow Perimeter Road until it intersects with Hospital Road. Turn left onto Hospital Road and then turn right on Givry Street. Take a right onto Jackson Road and turn left onto Patton Road. Bear right onto Sheridan Road and a right onto Queenstown Street. The hospital is on the left.

Site #11 Construction Debris Area #2. East on Lovell Street until it intersects with Hospital Road. Turn left onto Hospital Road and then turn right on Givry Street. Take a right onto Jackson Road and turn left onto Patton Road. Bear right onto Sheridan Road and a right onto Queenstown Street. The hospital is on the left.

Nashua River Study. Follow Perimeter Road until it intersects with Hospital Road. Turn left onto Hospital Road and then turn right on Givry Street. Take a right onto Jackson Road and turn left onto Patton Road. Bear right onto Sheridan Road and a right onto Queenstown Street. The hospital is on the left.



FORT DEVENS

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100
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SA-33, 34, 35

FIGURE 9-1
 ROUTES TO PRIMARY HOSPITAL
 FORT DEVENS, MASSACHUSETTS

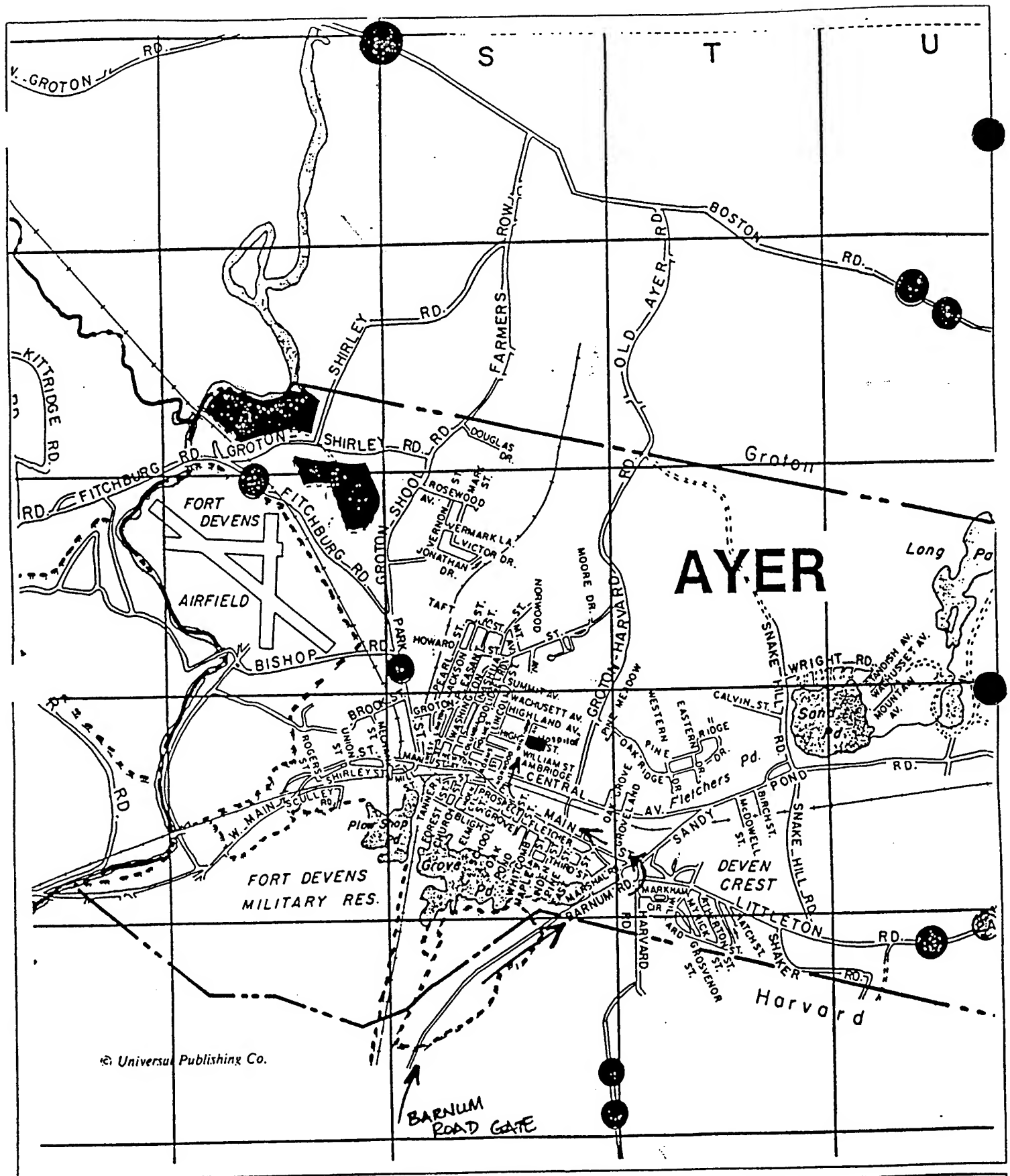


FIGURE 9
 ROUTES TO SECONDARY HOSPITAL
 FORT DEVENS, MASSACHUSETTS

**Site-Specific
Health and Safety Plan
Arthur D. Little, Inc.**

This plan is applicable for sites where the work involves unknown or uncharacterized chemical contamination. Please reference the Arthur D. Little Hazardous Waste Operation Health and Safety Program Plan for detail on the overall program. A copy of the most current Arthur D. Little Health and Safety Program Plan for Hazardous Waste Site Operations (April, 1992) and the Fort Devens Main Post Health and Safety Plan shall be available at the site in addition to other applicable documentation.

Job Name Fort Devens Site Investigation **Case No.** 67064

Site Location SA34, Former DEH Entomology Shop (Bldgs. 245 and 246)

Site History One of the former locations of entomology operations at Fort Devens, which include base-wide herbicide and pesticide applications, was based in Building 245. This building is located approximately 50 yards south of Building 262. The current use of this building is unknown and the interior may have been altered since the conclusion of former entomology operations. According to an interview with the former entomologist, no chemical mixing operations were conducted outside this building. However, small volumes of chemicals used for household applications were mixed inside. Building 246, located immediately north of Building 245, was also reportedly used for storage of pesticides.

Site Description/Nature of Work The proposed scope of work associated with this study area includes: records review; exploratory borings with associated soil samples from three depths per location (0-6 inches, 2-4 feet, and 8-10 feet) to evaluate the potential for subsurface infiltration of any chemicals used during entomology operations; surface soil samples distributed around the sides of the building to evaluate the potential for additional leaks or spills; and ten interior wipe samples to evaluate the potential for chemical residues to remain on the floors and walls as a result of chemical mixing and storage operations.

A site plan is provided in the Work Plan for the Fort Devens Main Post SI.

Dig Safe and Other Utilities Notified _____

By Whom _____ **Date** _____

Response _____

File Numbers _____

Primary Level of Protection: Level D+

Contingency Level of Protection: Level C (if dusting and odors are noted and/or action levels are reached).

Emergency Phone Numbers

ADL Health and Safety Office: Primary 800-677-3000 x6106 (C. Briggs), Alternate 800-677-3000 x6112 (P. Roy), Alternate 800-677-3000 x5884 (S. Stricoff)

Ambulance: 769-6911 **Fire:** 796-2220 **Police:** 796-3333

Hospital:

Name Culter Army Hospital

Address Building 3654 - Fort Devens

Hospital Phone Number 796-6911

Attach written directions and a map of the route to the nearest hospital (Attachment 1)

Other: Nashoba Community Hospital **Phone No.** 772-2657

Environmental/H&S - Bill Mullen **Phone No.** 796-3114

Location of Nearest Phone: _____

Site Hazards

Chemical Hazards (overview, include source and location of contaminants):

Organophosphorus pesticides; malathion, RoundupTM, DDT, Kerosene

Representative Chemicals	PEL/TLV/IDLH
<u>Malathion</u>	<u>10 mg/m³</u>
<u>RoundupTM</u>	<u>--</u>
<u>DDT</u>	<u>1 mg/m³</u>
<u>Kerosene (Fuel Oil)</u>	<u>--</u>

Factors Indicating the Nature of the Potential or Known Contaminants at the Site:

Site History: ☒ **Previous Sampling Results:** _____ **Current Use:** _____

Explain: _____

Major Routes of Exposure: Dermal, and inhalation primarily. Ingestion if good hygiene not practiced; potential eye exposure from dust generation; potential injection from cists caused by sharp objects.

Symptoms of Exposure/Potential Health Effects: See Attachment E.

Note: Pesticides and herbicides have characteristic odors but cannot be easily monitored with direct reading instruments. Upgrade a Level of Protection when in doubt.

Physical Hazards

If drilling, the general types of hazards associated with a drill rig are present, namely, slips and falls, falling objects, hand, foot and back injuries, etc. If digging test pits, the additional hazards of a swinging backhole bucket, collapse of excavation, etc., exist.

Noise Hazards

The noise associated with operation of a drill rig or other heavy equipment can cause permanent, irreversible hearing loss. "Impact noise," such as that caused by driving a well point or split spoon with a drill rig hammer, is especially damaging. Proper hearing protection (ear muffs or plugs) must be worn when near a source of loud noise.

Fire Hazards: Solvents used for wipe sampling and fuel tank of drill rig; underground fuel/gas lines on tanks; hitting buried containers.

Electrical Hazards: Live electrical circuits in building, overhead lines, potential exposed circuit boxes and wires; underground lines.

Oxygen Deficiency: Not anticipated.

Confined Space Entry: Not applicable; ADL prohibited from this type of work.

Radioactive Materials: Not anticipated but a general screening to be conducted.

Other Hazards: Heat stress, cold stress, environmental hazards (e.g., ticks, insects, etc.).

Personnel Health and Safety Requirements

Medical Monitoring Requirements. Site personnel must be participants in ADL's, or similar, medical monitoring program, and must have had their most recent exam within the previous 12 months. The exam must have indicated no medical restrictions that would inhibit personnel from performing the required work tasks.

Training Requirements. All site personnel must have the current 40 hours or 8 hours (refresher) of relevant health and safety training and/or experience which included coverage of hazard recognition, use of site monitoring instruments, use of personal protective equipment, etc. Personnel must also be oriented to the components of this site-specific plan. Attachment A shall be utilized to document training and physical examination records of site personnel. Attachment B shall be used to document orientation to this site-specific plan.

Site Health and Safety Procedures

Procedures for a Site "Walk-Over":

Practice contamination avoidance at all times; do not step in areas of obvious contamination; do not move unlabelled or unknown containers; do not kneel on ground, floor or other potentially contaminated surfaces; all efforts must be made to minimize contaminating clean work areas; wear proper personal protective equipment.

Procedures for Intrusive Site Work: (Drilling, Test Pits, etc.)

A. Personal Protective Equipment:

1. (a) PPE should be used on the site. (See the PPE Checklist attached to this plan; Attachment 2).

(b) Type of Respirator Cartridges: Organic vapor/acid gas/HEPA (GMC-H).

2. Additional Personal Protective Equipment: _____

B. Monitoring Equipment: HNu or Microtip; combustible gas/oxygen meter, Draeger colorimetric tubes. The field log book or Attachment C shall be used to document onsite environmental monitoring.

C. Additional Safety Equipment: _____

D. Health and Safety Work Procedures:

1. Site Briefings: Conduct a daily briefing with site personnel and go over work objectives and the major elements of this plan.

- Tailgate Safety Meeting Form
- In Field Notebook

2. Site Control: Control work areas using any combination of barricade tape, road cones, saw horses, etc. to prohibit the entry of unauthorized personnel; always use the buddy system.

3. Activity Specific Procedures:

- (a) Task(s): Collect surface soil samples.

Procedures: Don protective equipment (e.g., Tyvek, gloves, boots, etc.); use good auger handling procedures; do not kneel in potentially contaminated areas; if any odors are noted, upgrade to Level C and conduct air monitoring.

Action Levels: 19.5%-O₂; 10% of LEL; PID-Bkgd = D+; PID-Bkgd to 5 ppm for 5 minutes = C; PID->5 ppm for 5 minutes or peak of 30 ppm or greater-stop operations; RAD->2 mR/hr = stop work; leave area.

3. (b) Task(s): Collect wipe samples from the chemical mixing room.

Procedures: Don protective equipment (e.g., gloves, eye protection; use good wipe sampling procedures; do not kneel in potentially contaminated areas; if any odors are noted, upgrade to Level C and conduct air monitoring.

Action Levels: 19.5%-O₂; 10% of LEL; PID-Bkgd = D+; PID-Bkgd to 5 ppm for 5 minutes = C; PID->5 ppm for 5 minutes or peak of 30 ppm or greater-stop operations; RAD->2 mR/hr = stop work; leave area.

3. (c) Task(s): Collect soil samples from four borings.

Procedures: Don protective equipment (e.g., gloves, Styvek coated eye protection; use good drilling and sampling procedures; practice contamination avoidance; periodically monitor the bore hole; if odors are noted, upgrade to Level C and continue to monitor.

Action Levels: 19.5%-O₂; 10% of LEL; PID-Bkgd = D+; PID-Bkgd to 5 ppm for 5 minutes = C; PID->5 ppm for 5 minutes or peak of 30 ppm or greater-stop operations; RAD->2 mR/hr = stop work; leave area.

Other tasks (if applicable) are attached.

4. Personnel and Equipment Decontamination:

- Remove gross contamination from tools, respirator, monitoring equipment, boots, etc. prior to leaving the work-site, using water, paper towels, hand-wipes, etc.
- Either completely decontaminate soiled equipment at the work-site using detergent and water (if possible), or wrap equipment in plastic bag for transport until complete decontamination is possible.
- Always follow established personal decontamination procedures and remove contaminated gloves, Tyvek suits, used cartridges, paper towels, etc. by placing in a plastic bag and arrange for proper disposal.
- Wash hands and face thoroughly with soap and water before lunch or coffee breaks, and as soon as practicable after finishing work for the day.
- Additional Decontamination: Follow decontamination procedures in the program plan if more extensive decontamination is needed.

Emergency Procedures

Personal Injury. If authorized, administer appropriate first aid. The injured may need to be transported to the nearest hospital. If possible, notify hospital in advance of incoming patient and nature of injury. If there is a question about whether it is safe to move the victim, DO NOT move the victim - instead, make him/her as comfortable as possible, and summon emergency assistance.

Chemical Exposure. If site personnel show signs of inhalation exposure, retreat to fresh air for recovery. If symptoms warrant, bring the injured to the nearest hospital for observation, and discontinue work at that location and consult with H&S representative.

In case of skin or eye irritation due to chemical contact, wash affected skin with soap and water, or flush eyes with generous amount of water. If irritation is serious, seek medical attention.

Fire. If the fire can be easily contained and extinguished, do so with a portable fire extinguisher. If explosion risk is present, do not attempt to extinguish - evacuate all personnel to a safe area and call the fire department (796-2220).

Spills. If safe to do so, contain the spill if materials and equipment are available. If these materials are not available or the release is beyond the capabilities of site personnel, contact local emergency responders who are trained and equipped to control and cleanup the release (796-2220).

Important Note: If site observations, sampling results, or any other information indicates the presence of chemical contaminants other than those specified herein, this health and safety plan becomes void, and a new plan must be prepared and approved!

The field logbook or Attachment D shall be completed to document daily health and safety activities in the study areas.

Project Manager _____

Health & Safety Plan Prepared By _____ **Date** _____

Health & Safety Plan Approved By _____ **Date** _____

Arthur D. Little, Inc. PPE Checklist

- ☒ 1. MSA Ultratwin full-face air-purifying respirator, in a protective plastic bag
- ☒ 2. Nose cup insert for MSA Ultratwin respirator
- ☒ 3. Ear-muff set which fits into hardhat
- ☒ 4. Optional: Eyeglass kit for MSA Ultratwin respirator
- ☒ 5. MSA cartridges for respirator OV/AG/HEPA (GMC-H)
- ☒ 6. Protective lenses cover for MSA Ultratwin respirator
- ☒ 7. Disposable ear plugs
- ☒ 8. Silvershield gloves
- ☐ 9. Natural rubber gloves
- ☒ 10. Nitrile gloves
- ☒ 11. Polyethylene Tyvek suit
- ☒ 12. Saranex Tyvek suit
- ☒ 13. Safety glasses with side shields
- ☒ 14. Goggles
- ☒ 15. Plastic disposal bags
- ☒ 16. Hardhat
- ☒ 17. Duct tape
- ☒ 18. Other (list below)
 - Standard Tyvek for hand augering activities.
 - Polyethylene/Saranex coated/Tyvek for drilling.
 - No special body covering for wipe sampling.

Site-Specific Directions to Cutler Army Hospital

Site #33 DEH Entomology Shop (Bldg 262). Go south on Buena Vista to second stop sign (Dakota). Turn right on Dakota and take second left onto Queenstown Street. Hospital is on the left off Queenstown Street.

Site #34 Former DEH Entomology Shop at Bldg 245. Go south on Buena Vista to second stop sign (Dakota). Turn right on Dakota and take second left onto Queenstown Street. Hospital is on the left off Queenstown Street.

Site #35 Former DEH Entomology Shop at Bldg 254. Go south on Buena Vista to second stop sign (Dakota). Turn right on Dakota and take second left onto Queenstown Street. Hospital is on the left off Queenstown Street.

Site #36 Former DEH Entomology Shop at Bldg 272B. Go south on Buena Vista to second stop sign (Dakota). Turn right on Dakota and take second left onto Queenstown Street. Hospital is on the left off Queenstown Street.

Site #37 Golf Course Entomology Shop (Bldg 3622). Turn right onto Patton Road and first right onto Queenstown Street. Hospital is on the left.

Site #16 Shoppette Debris Disposal Area. Follow Patton Road until Queenstown Street appears on left. Take a left onto Queenstown Street. Hospital is to the left.

Site #17 Little Mirror Lake. (Follow Site #16, or) Follow Sheridan Road to Queenstown Street. Take a right onto Queenstown Street. Hospital is on the right.

Site #29 Transformer Storage Area. Follow Saratoga Street to Patton Road. Take a right onto Patton Road and a left onto Queenstown Street. Hospital is on the left.

Site #39 Transformer Near Bldg. 4250. Come back under Route 2. Take left onto Sheridan Road and a right onto Queenstown Street. Hospital is on the right.

Site #10 Construction Debris Area #1. Follow Perimeter Road until it intersects with Hospital Road. Turn left onto Hospital Road and then turn right on Givry Street. Take a right onto Jackson Road and turn left onto Patton Road. Bear right onto Sheridan Road and a right onto Queenstown Street. The hospital is on the left.

Site #11 Construction Debris Area #2. East on Lovell Street until it intersects with Hospital Road. Turn left onto Hospital Road and then turn right on Givry Street. Take a right onto Jackson Road and turn left onto Patton Road. Bear right onto Sheridan Road and a right onto Queenstown Street. The hospital is on the left.

Nashua River Study. Follow Perimeter Road until it intersects with Hospital Road. Turn left onto Hospital Road and then turn right on Givry Street. Take a right onto Jackson Road and turn left onto Patton Road. Bear right onto Sheridan Road and a right onto Queenstown Street. The hospital is on the left.



FORT DEVENS

ROUTE	TO	FROM	TIME
1	Fort Devens	Fort Devens	0:00
2	Fort Devens	Fort Devens	0:00
3	Fort Devens	Fort Devens	0:00
4	Fort Devens	Fort Devens	0:00
5	Fort Devens	Fort Devens	0:00
6	Fort Devens	Fort Devens	0:00
7	Fort Devens	Fort Devens	0:00
8	Fort Devens	Fort Devens	0:00
9	Fort Devens	Fort Devens	0:00
10	Fort Devens	Fort Devens	0:00
11	Fort Devens	Fort Devens	0:00
12	Fort Devens	Fort Devens	0:00
13	Fort Devens	Fort Devens	0:00
14	Fort Devens	Fort Devens	0:00
15	Fort Devens	Fort Devens	0:00
16	Fort Devens	Fort Devens	0:00
17	Fort Devens	Fort Devens	0:00
18	Fort Devens	Fort Devens	0:00
19	Fort Devens	Fort Devens	0:00
20	Fort Devens	Fort Devens	0:00
21	Fort Devens	Fort Devens	0:00
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28	Fort Devens	Fort Devens	0:00
29	Fort Devens	Fort Devens	0:00
30	Fort Devens	Fort Devens	0:00
31	Fort Devens	Fort Devens	0:00
32	Fort Devens	Fort Devens	0:00
33	Fort Devens	Fort Devens	0:00
34	Fort Devens	Fort Devens	0:00
35	Fort Devens	Fort Devens	0:00

SA-33, 34, 35

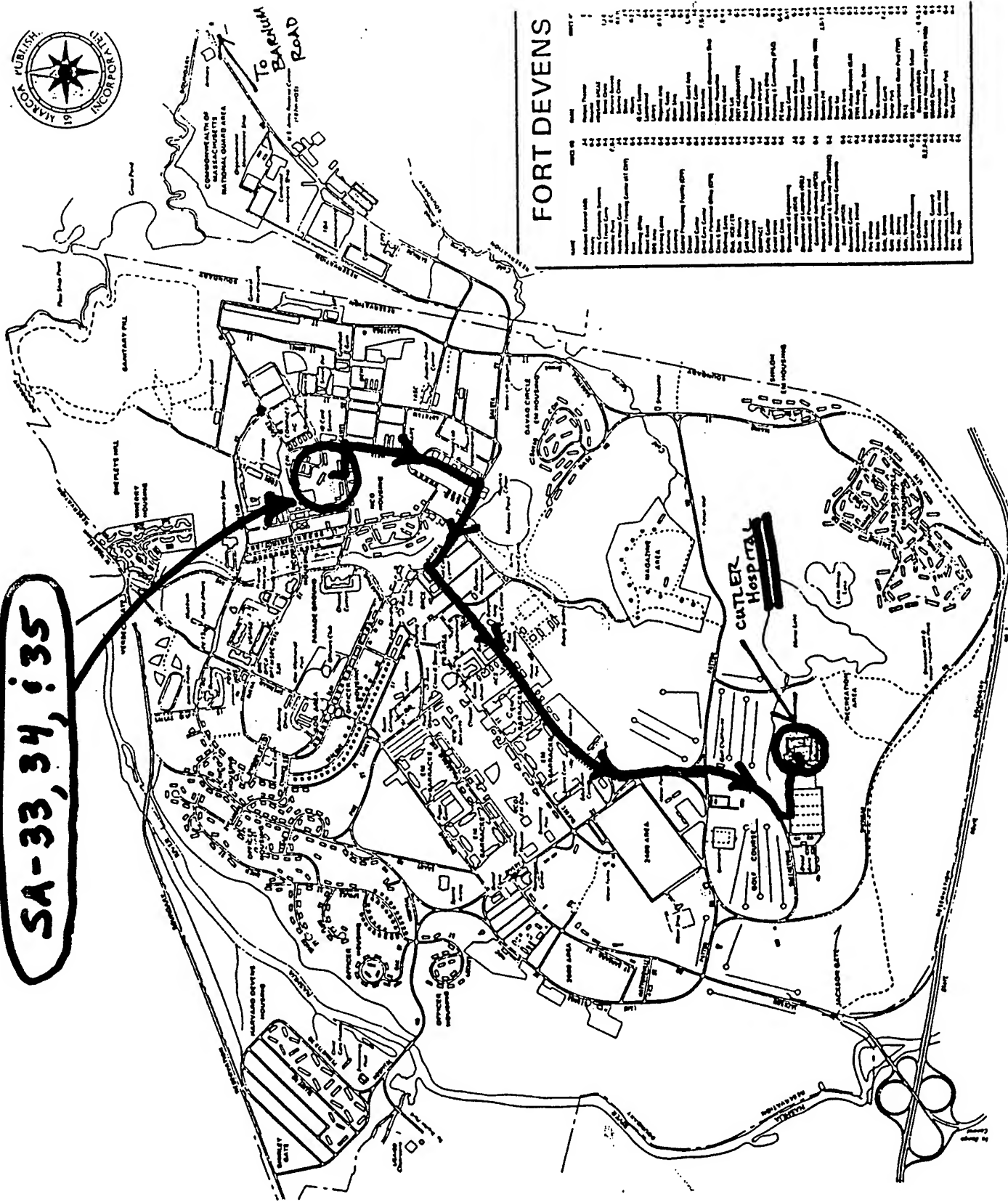


FIGURE 9-1
ROUTES TO PRIMARY HOSPITAL
FORT DEVENS, MASSACHUSETTS

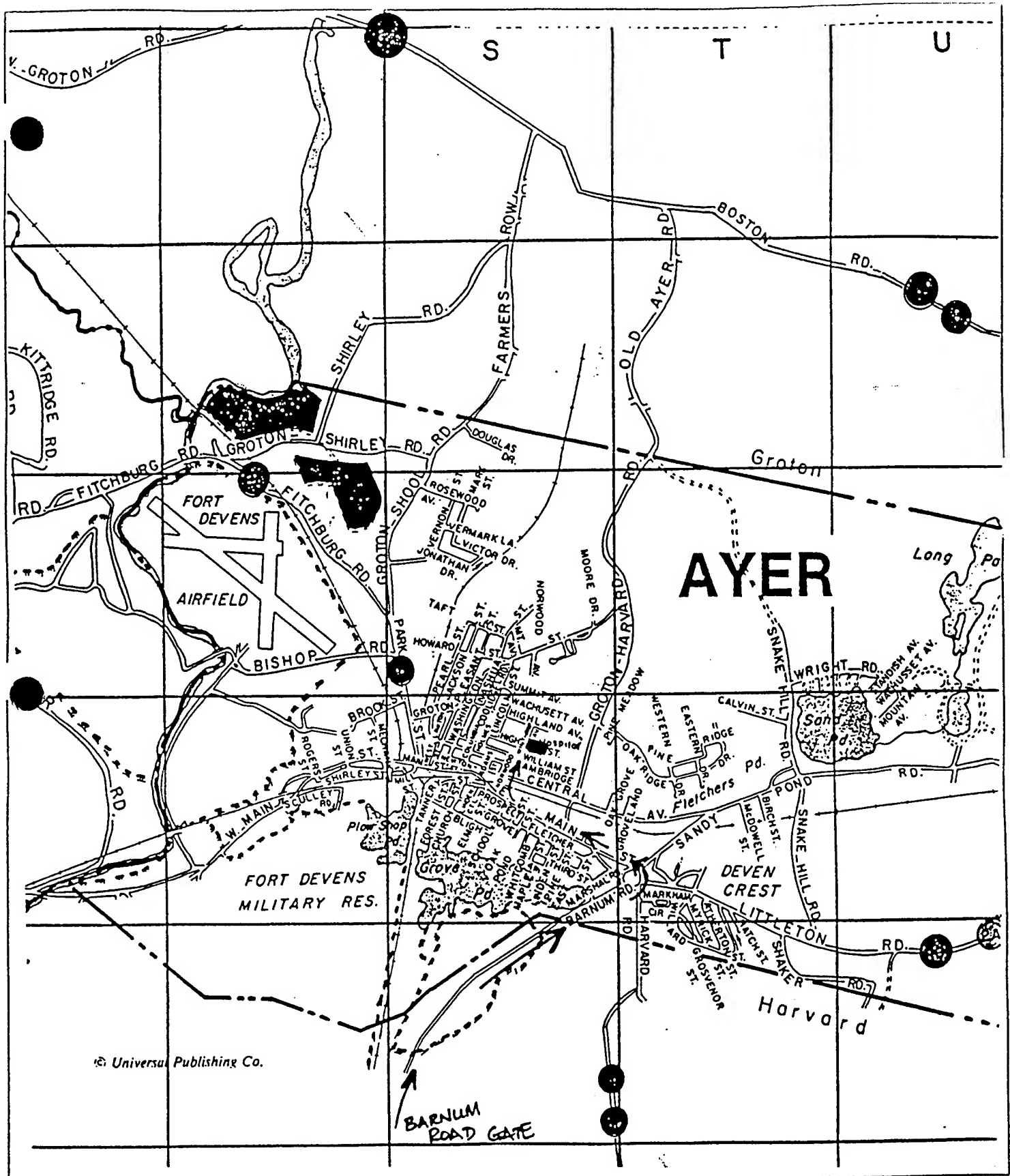


FIGURE 9-2
 ROUTES TO SECONDARY HOSPITAL
 FORT DEVENS, MASSACHUSETTS

**Site-Specific
Health and Safety Plan
Arthur D. Little, Inc.**

This plan is applicable for sites where the work involves unknown or uncharacterized chemical contamination. Please reference the Arthur D. Little Hazardous Waste Operation Health and Safety Program Plan for detail on the overall program. A copy of the most current Arthur D. Little Health and Safety Program Plan for Hazardous Waste Site Operations (April, 1992) and the Fort Devens Main Post Health and Safety Plan shall be available at the site in addition to other applicable documentation.

Job Name Fort Devens Site Investigation **Case No.** 67064

Site Location SA35, DEH Entomology Shop (Bldg. 254)

Site History Current entomology support operations at Fort Devens, which include storage facilities for a 250 gallon herbicide and pesticide mobil applicator tank, are located in Building 254. This building is located immediately adjacent to, and southeast of Building 262. This building is essentially a garage with an unpaved dirt floor. It is unclear whether the 250 gallon Rotomist applicator was ever stored in this building while chemical agents remained in the tank, or whether the tank ever leaked. Although no chemical mixing operations were reported to have been conducted in this building, the entrance is immediately adjacent to the exterior chemical mixing area identified in association with Building 262.

Site Description/Nature of Work The proposed scope of work associated with this study area includes: records review; exploratory borings with associated soil samples from three depths per location (0-6 inches, 2-4 feet, 8-10 feet) to evaluate the potential for subsurface infiltration of any chemicals used during entomology operations; surface soil samples collected near the potential exterior chemical mixing area; and surface soil samples distributed within the interior of the building to evaluate the potential for leaks or spills.

A site plan is provided in the Work Plan for the Fort Devens Main Post SI.

Dig Safe and Other Utilities Notified _____

By Whom _____ **Date** _____

Response _____

File Numbers _____

Primary Level of Protection: Level D+

Contingency Level of Protection: Level C (if dusting, odors are noted and/or action levels are reached).

Emergency Phone Numbers

ADL Health and Safety Office: Primary 800-677-3000 x6106 (C. Briggs), Alternate 800-677-3000 x6112 (P. Roy), Alternate 800-677-3000 x5884 (S. Stricoff)

Ambulance: 769-6911 **Fire:** 796-2220 **Police:** 796-3333

Hospital:

Name Culter Army Hospital

Address Building 3654 - Fort Devens

Hospital Phone Number 796-6911

Attach written directions and a map of the route to the nearest hospital (Attachment 1)

Other: Nashoba Community Hospital **Phone No.** 772-2657

Environmental/H&S - Bill Mullen **Phone No.** 796-3114

Location of Nearest Phone: _____

Site Hazards

Chemical Hazards (overview, include source and location of contaminants):

Organophosphorus pesticides; malathion, RoundupTM DDT, Kerosene.

Representative Chemicals	PEL/TLV/IDLH
<u>Malathion</u>	<u>10 mg/m³</u>
<u>RoundupTM</u>	<u>--</u>
<u>DDT</u>	<u>1 mg/m³</u>
<u>Kerosene (Fuel Oil)</u>	<u>--</u>

Factors Indicating the Nature of the Potential or Known Contaminants at the Site:

Site History: ✓ **Previous Sampling Results:** _____ **Current Use:** _____

Explain: _____

Major Routes of Exposure: Dermal, and inhalation primarily; ingestion if good hygiene not practiced; potential eye exposure from dust generation; potential injection from cuts caused by sharp objects.

Symptoms of Exposure/Potential Health Effects: See Attachment E.

Note: Pesticides and herbicides have characteristic odors but cannot be easily monitored with direct reading instruments. Upgrade a Level of Protection when in doubt.

Physical Hazards

If drilling, the general types of hazards associated with a drill rig are present, namely, slips and falls, falling objects, hand, foot and back injuries, etc. If digging test pits, the additional hazards of a swinging backhole bucket, collapse of excavation, etc., exist.

Noise Hazards

The noise associated with operation of a drill rig or other heavy equipment can cause permanent, irreversible hearing loss. "Impact noise," such as that caused by driving a well point or split spoon with a drill rig hammer, is especially damaging. Proper hearing protection (ear muffs or plugs) must be worn when near a source of loud noise.

Fire Hazards: Fuel tank of drilling rig; underground fuel/gas lines on tanks; hitting buried containers.

Electrical Hazards: Live electrical circuits in building, overhead lines, potential exposed circuit boxes and wires; underground lines.

Oxygen Deficiency: Not anticipated.

Confined Space Entry: Not applicable; ADL prohibited from this type of work.

Radioactive Materials: Not anticipated but a general screening to be conducted.

Other Hazards: Heat stress, cold stress, environmental hazards (e.g., ticks, insects, etc.).

Personnel Health and Safety Requirements

Medical Monitoring Requirements. Site personnel must be participants in ADL's, or similar, medical monitoring program, and must have had their most recent exam within the previous 12 months. The exam must have indicated no medical restrictions that would inhibit personnel from performing the required work tasks.

Training Requirements. All site personnel must have the current 40 hours or 8 hours (refresher) of relevant health and safety training and/or experience which included coverage of hazard recognition, use of site monitoring instruments, use of personal protective equipment, etc. Personnel must also be oriented to the components of this site-specific plan. Attachment A shall be utilized to document training and physical examination records of site personnel. Attachment B shall be used to document orientation to this site-specific plan.

Site Health and Safety Procedures

Procedures for a Site "Walk-Over":

Practice contamination avoidance at all times; do not step in areas of obvious contamination; do not move unlabelled or unknown containers; do not kneel on ground, floor or other potentially contaminated surfaces; all efforts must be made to minimize contaminating clean work areas; wear proper personal protective equipment.

Procedures for Intrusive Site Work: (Drilling, Test Pits, etc.)

A. Personal Protective Equipment:

1. (a) PPE should be used on the site. (See the PPE Checklist attached to this plan; Attachment 2).

(b) Type of Respirator Cartridges: OV/AG/HEPA (GMC-H)

2. Additional Personal Protective Equipment: _____

B. Monitoring Equipment: HNu or Microtip; combustible gas/oxygen meter, Draeger colormetric tubes. The field log book or Attached C shall be used to document onsite environmental monitoring.

C. Additional Safety Equipment: _____

D. Health and Safety Work Procedures:

1. Site Briefings: Conduct a daily briefing with site personnel and go over work objectives and the major elements of this plan.

- Tailgate Safety Meeting Form
- In Field Notebook

2. Site Control: Control work areas using any combination of barricade tape, road cones, saw horses, etc. to prohibit the entry of unauthorized personnel; use buddy system.

3. Activity Specific Procedures:

(a) Task(s): Collect surface soil samples.

Procedures: Don protective equipment (e.g., Tyvek, gloves, boots, etc.); use good auger handling procedures; do not kneel in potentially contaminated areas; if any odors are noted, upgrade to Level C and conduct air monitoring.

Action Levels: 19.5%-O₂; 10% of LEL; PID-Bkgd = D+; PID-Bkgd to 5 ppm for 5 minutes = C; PID->5 ppm for 5 minutes or peak of 30 ppm or greater-stop operations; RAD->2 mR/hr = stop work; leave area.

3. (b) Task(s): Collect soil samples from borings.

Procedures: Don protective equipment (e.g., gloves, eye protection; use good wipe sampling procedures; do not kneel in potentially contaminated areas; if any odors are noted, upgrade to Level C and conduct air monitoring.

Action Levels: 19.5%-O₂; 10% of LEL; PID-Bkgd = D+; PID-Bkgd to 5 ppm for 5 minutes = C; PID->5 ppm for 5 minutes or peak of 30 ppm or greater-stop operations; RAD->2 mR/hr = stop work; leave area.

Other tasks (if applicable) are attached.

4. Personnel and Equipment Decontamination:

- Remove gross contamination from tools, respirator, monitoring equipment, boots, etc. prior to leaving the work-site, using water, paper towels, handi-wipes, etc.
- Either completely decontaminate soiled equipment at the work-site using detergent and water (if possible), or wrap equipment in plastic bag for transport until complete decontamination is possible.
- Always follow established personal decontamination procedures and remove contaminated gloves, Tyvek suits, used cartridges, paper towels, etc. by placing in a plastic bag and arrange for proper disposal.
- Wash hands and face thoroughly with soap and water before lunch or coffee breaks, and as soon as practicable after finishing work for the day.
- Additional Decontamination: Follow decontamination procedures in the program plan if more extensive decontamination is needed.

Emergency Procedures

Personal Injury. If authorized, administer appropriate first aid. The injured may need to be transported to the nearest hospital. If possible, notify hospital in advance of incoming patient and nature of injury. If there is a question about whether it is safe to move the victim, DO NOT move the victim - instead, make him/her as comfortable as possible, and summon emergency assistance.

Chemical Exposure. If site personnel show signs of inhalation exposure, retreat to fresh air for recovery. If symptoms warrant, bring the injured to the nearest hospital for observation, and discontinue work at that location and consult with H&S representative.

In case of skin or eye irritation due to chemical contact, wash affected skin with soap and water, or flush eyes with generous amount of water. If irritation is serious, seek medical attention.

Fire. If the fire can be easily contained and extinguished, do so with a portable fire extinguisher. If explosion risk is present, do not attempt to extinguish - evacuate all personnel to a safe area and call the fire department (796-2220).

Spills. If safe to do so, contain the spill if materials and equipment are available. If these materials are not available or the release is beyond the capabilities of site personnel, contact local emergency responders who are trained and equipped to control and cleanup the release (796-2220).

Important Note: If site observations, sampling results, or any other information indicates the presence of chemical contaminants other than those specified herein, this health and safety plan becomes void, and a new plan must be prepared and approved!

The field logbook or Attachment D shall be completed to document daily health and safety activities in the study areas.

Project Manager _____

Health & Safety Plan Prepared By _____ **Date** _____

Health & Safety Plan Approved By _____ **Date** _____

Arthur D. Little, Inc. PPE Checklist

- ☒ 1. MSA Ultratwin full-face air-purifying respirator, in a protective plastic bag
- ☒ 2. Nose cup insert for MSA Ultratwin respirator
- ☒ 3. Ear-muff set which fits into hardhat
- ☒ 4. Optional: Eyeglass kit for MSA Ultratwin respirator
- ☒ 5. MSA cartridges for respirator OV/AG/HEPA (GMC-H)
- ☒ 6. Protective lenses cover for MSA Ultratwin respirator
- ☒ 7. Disposable ear plugs
- ☒ 8. Silvershield gloves
- ☐ 9. Natural rubber gloves
- ☒ 10. Nitrile gloves
- ☒ 11. Polyethylene Tyvek suit
- ☒ 12. Saranex Tyvek suit
- ☒ 13. Safety glasses with side shields
- ☒ 14. Goggles
- ☒ 15. Plastic disposal bags
- ☒ 16. Hardhat
- ☒ 17. Duct tape
- ☒ 18. Other (list below)
 - Standard Tyvek for hand augering activities.
 - Polyethylene/Saranex coated/Tyvek for drilling.
 - No special body covering for wipe sampling.

Site-Specific Directions to Cutler Army Hospital

Site #33 DEH Entomology Shop (Bldg 262). Go south on Buena Vista to second stop sign (Dakota). Turn right on Dakota and take second left onto Queenstown Street. Hospital is on the left off Queenstown Street.

Site #34 Former DEH Entomology Shop at Bldg 245. Go south on Buena Vista to second stop sign (Dakota). Turn right on Dakota and take second left onto Queenstown Street. Hospital is on the left off Queenstown Street.

Site #35 Former DEH Entomology Shop at Bldg 254. Go south on Buena Vista to second stop sign (Dakota). Turn right on Dakota and take second left onto Queenstown Street. Hospital is on the left off Queenstown Street.

Site #36 Former DEH Entomology Shop at Bldg 272B. Go south on Buena Vista to second stop sign (Dakota). Turn right on Dakota and take second left onto Queenstown Street. Hospital is on the left off Queenstown Street.

Site #37 Golf Course Entomology Shop (Bldg 3622). Turn right onto Patton Road and first right onto Queenstown Street. Hospital is on the left.

Site #16 Shoppette Debris Disposal Area. Follow Patton Road until Queenstown Street appears on left. Take a left onto Queenstown Street. Hospital is to the left.

Site #17 Little Mirror Lake. (Follow Site #16, or) Follow Sheridan Road to Queenstown Street. Take a right onto Queenstown Street. Hospital is on the right.

Site #29 Transformer Storage Area. Follow Saratoga Street to Patton Road. Take a right onto Patton Road and a left onto Queenstown Street. Hospital is on the left.

Site #39 Transformer Near Bldg. 4250. Come back under Route 2. Take left onto Sheridan Road and a right onto Queenstown Street. Hospital is on the right.

Site #10 Construction Debris Area #1. Follow Perimeter Road until it intersects with Hospital Road. Turn left onto Hospital Road and then turn right on Givry Street. Take a right onto Jackson Road and turn left onto Patton Road. Bear right onto Sheridan Road and a right onto Queenstown Street. The hospital is on the left.

Site #11 Construction Debris Area #2. East on Lovell Street until it intersects with Hospital Road. Turn left onto Hospital Road and then turn right on Givry Street. Take a right onto Jackson Road and turn left onto Patton Road. Bear right onto Sheridan Road and a right onto Queenstown Street. The hospital is on the left.

Nashua River Study. Follow Perimeter Road until it intersects with Hospital Road. Turn left onto Hospital Road and then turn right on Givry Street. Take a right onto Jackson Road and turn left onto Patton Road. Bear right onto Sheridan Road and a right onto Queenstown Street. The hospital is on the left.

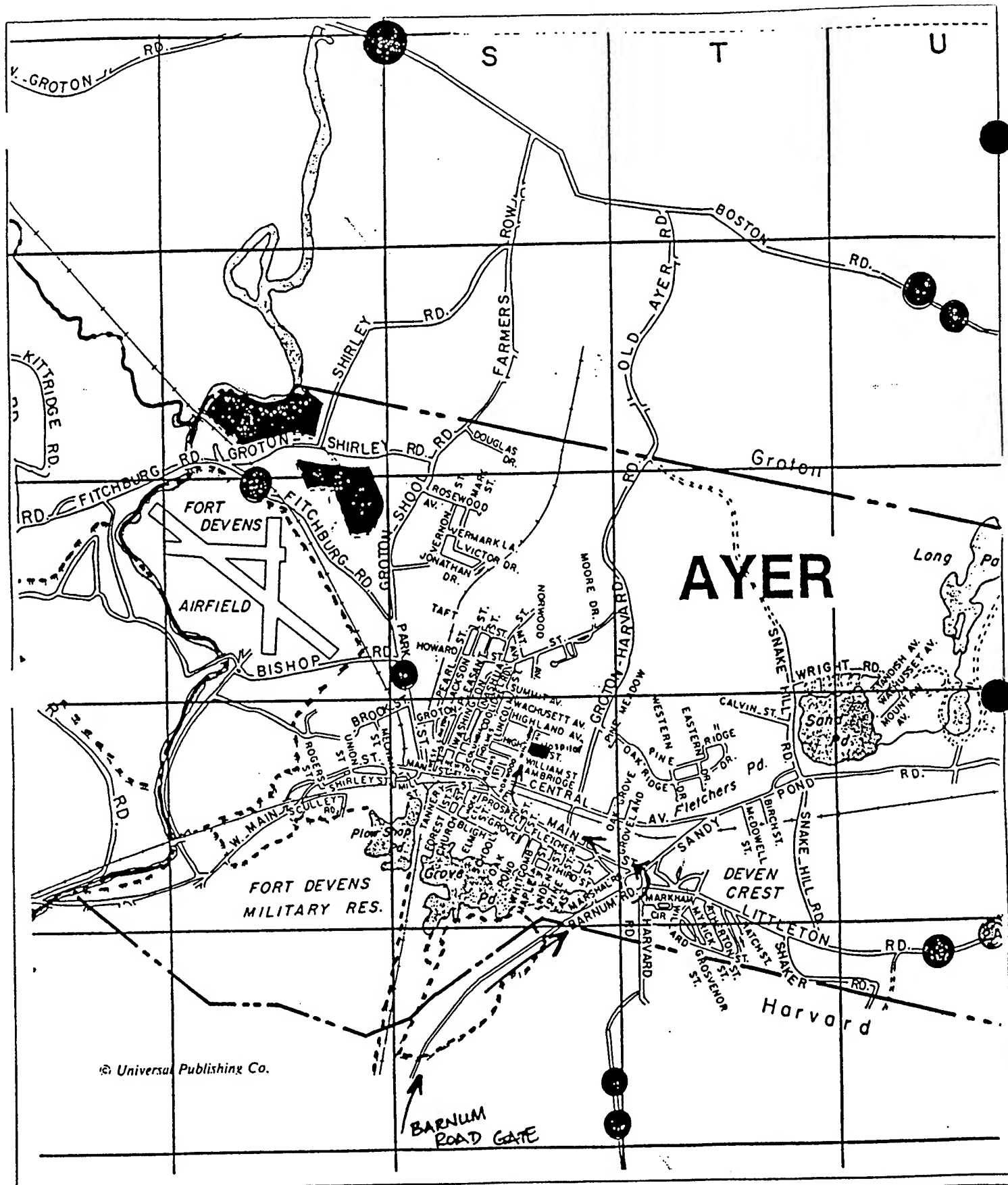


FIGURE 9
 ROUTES TO SECONDARY HOSPITAL
 FORT DEVENS, MASSACHUSETTS

**Site-Specific
Health and Safety Plan
Arthur D. Little, Inc.**

This plan is applicable for sites where the work involves unknown or uncharacterized chemical contamination. Please reference the Arthur D. Little Hazardous Waste Operation Health and Safety Program Plan for detail on the overall program. A copy of the most current Arthur D. Little Health and Safety Program Plan for Hazardous Waste Site Operations (April, 1992) and the Fort Devens Main Post Health and Safety Plan shall be available at the site in addition to other applicable documentation.

Job Name Fort Devens Site Investigation **Case No.** 67064

Site Location SA36, Former DEH Entomology Shop (Bldg. 2728)

Site History One of the former locations of entomology operations at Fort Devens, which include base-wide herbicide and pesticide applications, was based in Building 2728. This building has an attached garage where applicator vehicles were parked and a small chemical storage shed is located behind the building. Mixing of small amounts of chemicals for household applications were conducted indoors while larger scale chemical mixing was conducted along the eastern exterior of the building. A storm sewer catch basin is located immediately adjacent to the reported exterior chemical mixing area which discharges to a westward flowing small stream located approximately 40 feet south of Building 2728.

Site Description/Nature of Work The proposed scope of work associated with this study area includes: records review; exploratory borings with associated soil samples from three depths per location (0-6 inches, 2-4 feet, 8-10 feet) to evaluate the potential for subsurface infiltration of any chemicals used during entomology operations; surface soil samples collected near the reported exterior chemical mixing area; surface soil samples distributed around the chemical storage shed to evaluate the potential for leaks or spills; sediment samples from within the storm sewer catch basin; surface water and sediment samples distributed along flow of the stream channel; and interior wipe samples to evaluate the potential for chemical residues to remain on the floors and walls as a result of chemical mixing and storage operations.

A site plan is provided in the Work Plan for the Fort Devens Main Post SI.

Dig Safe and Other Utilities Notified _____

By Whom _____ Date _____

Response _____

File Numbers _____

Primary Level of Protection: Level D+

Contingency Level of Protection: Level C (if dusting and odors are noted and/or action levels are reached).

Emergency Phone Numbers

ADL Health and Safety Office: Primary 800-677-3000 x6106 (C. Briggs), Alternate 800-677-3000 x6112 (P. Roy), Alternate 800-677-3000 x5884 (S. Stricoff)

Ambulance: 769-6911 Fire: 796-2220 Police: 796-3333

Hospital:

Name Culter Army Hospital

Address Building 3654 - Fort Devens

Hospital Phone Number 796-6911

Attach written directions and a map of the route to the nearest hospital (Attachment 1)

Other: Nashoba Community Hospital Phone No. 772-2657

Environmental/H&S - Bill Mullen Phone No. 796-3114

Location of Nearest Phone: _____

Site Hazards

Chemical Hazards (overview, include source and location of contaminants):

Organophosphorus pesticides; malathion, RoundupTM, DDT, Kerosene.

Representative Chemicals	PEL/TLV/IDLH
<u>Malathion</u>	<u>10 mg/m³</u>
<u>RoundupTM</u>	<u>--</u>
<u>DDT</u>	<u>1 mg/m³</u>
<u>Kerosene (Fuel Oil)</u>	<u>--</u>

Factors Indicating the Nature of the Potential or Known Contaminants at the Site:

Site History: ☒ Previous Sampling Results: _____ Current Use: _____

Explain: _____

Major Routes of Exposure: Dermal and inhalation primarily; ingestion if good hygiene not practiced; potential eye exposure from dust generation; potential injection from cuts caused by sharp objects.

Symptoms of Exposure/Potential Health Effects: See Attachment E.

Note: Pesticides and herbicides have characteristic odors but cannot be easily monitored with direct reading instruments. Upgrade a Level of Protection when in doubt.

Physical Hazards

If drilling, the general types of hazards associated with a drill rig are present, namely, slips and falls, falling objects, hand, foot and back injuries, etc. If digging test pits, the additional hazards of a swinging backhole bucket, collapse of excavation, etc., exist.

Noise Hazards

The noise associated with operation of a drill rig or other heavy equipment can cause permanent, irreversible hearing loss. "Impact noise," such as that caused by driving a well point or split spoon with a drill rig hammer, is especially damaging. Proper hearing protection (ear muffs or plugs) must be worn when near a source of loud noise.

Fire Hazards: Solvents used for wipe sampling and equipment documentation; fuel tank of drill rig; underground fuel/gas lines on tanks; hitting buried containers.

Electrical Hazards: Live electrical circuits in building, overhead lines, potential exposed circuit boxes and wires; underground lines.

Oxygen Deficiency: Not anticipated.

Confined Space Entry: Not applicable; ADL prohibited from this type of work.

Radioactive Materials: Not anticipated but a general screening to be conducted.

Other Hazards: Heat stress, cold stress, environmental hazards (e.g., ticks, insects, etc.).

Personnel Health and Safety Requirements

Medical Monitoring Requirements. Site personnel must be participants in ADL's, or similar, medical monitoring program, and must have had their most recent exam within the previous 12 months. The exam must have indicated no medical restrictions that would inhibit personnel from performing the required work tasks.

Training Requirements. All site personnel must have the current 40 hours or 8 hours (refresher) of relevant health and safety training and/or experience which included coverage of hazard recognition, use of site monitoring instruments, use of personal protective equipment, etc. Personnel must also be oriented to the components of this site-specific plan. Attachment A shall be utilized to document training and physical examination records of site personnel. Attachment B shall be used to document orientation to this site-specific plan.

Site Health and Safety Procedures

Procedures for a Site "Walk-Over":

Practice contamination avoidance at all times; do not step in areas of obvious contamination; do not move unlabelled or unknown containers; do not kneel on ground, floor or other potentially contaminated surfaces; all efforts must be made to minimize contaminating clean work areas; wear proper personal protective equipment.

Procedures for Intrusive Site Work: (Drilling, Test Pits, etc.)

A. Personal Protective Equipment:

1. (a) PPE should be used on the site. (See the PPE Checklist attached to this plan; Attachment 2).

(b) Type of Respirator Cartridges: Organic vapor/acid gas/HEPA (GMC-H)

2. Additional Personal Protective Equipment: _____

B. Monitoring Equipment: HNu or Microtip; combustible gas/oxygen meter, Draeger colorimetric tubes. The field log book or Attachment C shall be used to document onsite environmental monitoring.

C. Additional Safety Equipment: PFD if a boat is to be used to collect water/sediment samples; rubber chest waders also to be used if collection is not from a boat.

D. Health and Safety Work Procedures:

1. Site Briefings: Conduct a daily briefing with site personnel and go over work objectives and the major elements of this plan.
 - Tailgate Safety Meeting Form
 - In Field Notebook

2. Site Control: Control work areas using any combination of barricade tape, road cones, saw horses, etc. to prohibit the entry of unauthorized personnel; use buddy system.

3. Activity Specific Procedures:

- (a) Task(s): Collect surface soil samples.

Procedures: Don protective equipment (e.g., Tyvek, gloves, boots, etc.); use good auger handling procedures; do not kneel in potentially contaminated areas; if any odors are noted, upgrade to Level C and conduct air monitoring.

Action Levels: 19.5%-O₂; 10% of LEL; PID-Bkgd = D+; PID-Bkgd to 5 ppm for 5 minutes = C; PID->5 ppm for 5 minutes or peak of 30 ppm or greater-stop operations; RAD->2 mR/hr = stop work; leave area.

3. (b) Task(s): Collect wipe samples from walls and floor.

Procedures: Don protective equipment (e.g., gloves, eye protection; use good wipe sampling procedures; do not kneel in potentially contaminated areas; if any odors are noted, upgrade to Level C and conduct air monitoring.

Action Levels: 19.5%-O₂; 10% of LEL; PID-Bkgd = D+; PID-Bkgd to 5 ppm for 5 minutes = C; PID->5 ppm for 5 minutes or peak of 30 ppm or greater-stop operations; RAD->2 mR/hr = stop work; leave area.

3. (c) Task(s): Collect soil samples from borings.

Procedures: Don protective equipment (e.g., gloves, Styvek coated eye protection; use good drilling and sampling procedures; practice contamination avoidance; periodically monitor the bore hole; if odors are noted, upgrade to Level C and continue to monitor.

Action Levels: 19.5%-O₂; 10% of LEL; PID-Bkgd = D+; PID-Bkgd to 5 ppm for 5 minutes = C; PID->5 ppm for 5 minutes or peak of 30 ppm or greater-stop operations; RAD->2 mR/hr = stop work; leave area.

3. (d) Task(s): Collect surface water and sediment samples.

Procedures: Don protective equipment (e.g., PFD chest waders, gloves, goggles, etc.); use good sampling procedures; use extra care when walking in shallows (e.g., uneven surfaces, holes, etc.). Use buddy system at all times.

Action Levels: N/A

4. Personnel and Equipment Decontamination:

- Remove gross contamination from tools, respirator, monitoring equipment, boots, etc. prior to leaving the work-site, using water, paper towels, hand-wipes, etc.
- Either completely decontaminate soiled equipment at the work-site using detergent and water (if possible), or wrap equipment in plastic bag for transport until complete decontamination is possible.
- Always follow established personal decontamination procedures and remove contaminated gloves, Tyvek suits, used cartridges, paper towels, etc. by placing in a plastic bag and arrange for proper disposal.
- Wash hands and face thoroughly with soap and water before lunch or coffee breaks, and as soon as practicable after finishing work for the day.
- Additional Decontamination: Follow decontamination procedures in the program plan if more extensive decontamination is needed.

Emergency Procedures

Personal Injury. If authorized, administer appropriate first aid. The injured may need to be transported to the nearest hospital. If possible, notify hospital in advance of incoming patient and nature of injury. If there is a question about whether it is safe to move the victim, DO NOT move the victim - instead, make him/her as comfortable as possible, and summon emergency assistance.

Chemical Exposure. If site personnel show signs of inhalation exposure, retreat to fresh air for recovery. If symptoms warrant, bring the injured to the nearest hospital for observation, and discontinue work at that location and consult with H&S representative.

In case of skin or eye irritation due to chemical contact, wash affected skin with soap and water, or flush eyes with generous amount of water. If irritation is serious, seek medical attention.

Fire. If the fire can be easily contained and extinguished, do so with a portable fire extinguisher. If explosion risk is present, do not attempt to extinguish - evacuate all personnel to a safe area and call the fire department (796-2220).

Spills. If safe to do so, contain the spill if materials and equipment are available. If these materials are not available or the release is beyond the capabilities of site personnel, contact local emergency responders who are trained and equipped to control and cleanup the release (796-2220).

Important Note: If site observations, sampling results, or any other information indicates the presence of chemical contaminants other than those specified herein, this health and safety plan becomes void, and a new plan must be prepared and approved!

The field logbook or Attachment D shall be completed to document daily health and safety activities in the study areas.

Project Manager _____

Health & Safety Plan Prepared By _____ **Date** _____

Health & Safety Plan Approved By _____ **Date** _____

Arthur D. Little, Inc. PPE Checklist

- ☒ 1. MSA Ultratwin full-face air-purifying respirator, in a protective plastic bag
- ☒ 2. Nose cup insert for MSA Ultratwin respirator
- ☒ 3. Ear-muff set which fits into hardhat
- ☒ 4. Optional: Eyeglass kit for MSA Ultratwin respirator
- ☒ 5. MSA cartridges for respirator OV/AG/HEPA (GMC-H)
- ☒ 6. Protective lenses cover for MSA Ultratwin respirator
- ☒ 7. Disposable ear plugs
- ☒ 8. Silvershield gloves
- ☐ 9. Natural rubber gloves
- ☒ 10. Nitrile gloves
- ☒ 11. Polyethylene Tyvek suit
- ☒ 12. Saranex Tyvek suit
- ☒ 13. Safety glasses with side shields
- ☒ 14. Goggles
- ☒ 15. Plastic disposal bags
- ☒ 16. Hardhat
- ☒ 17. Duct tape
- ☒ 18. Other (list below)
 - Standard Tyvek for hand augering activities.
 - Polyethylene/Saranex coated/Tyvek for drilling.
 - No special body covering for wipe sampling.

Site-Specific Directions to Cutler Army Hospital

Site #33 DEH Entomology Shop (Bldg 262). Go south on Buena Vista to second stop sign (Dakota). Turn right on Dakota and take second left onto Queenstown Street. Hospital is on the left off Queenstown Street.

Site #34 Former DEH Entomology Shop at Bldg 245. Go south on Buena Vista to second stop sign (Dakota). Turn right on Dakota and take second left onto Queenstown Street. Hospital is on the left off Queenstown Street.

Site #35 Former DEH Entomology Shop at Bldg 254. Go south on Buena Vista to second stop sign (Dakota). Turn right on Dakota and take second left onto Queenstown Street. Hospital is on the left off Queenstown Street.

Site #36 Former DEH Entomology Shop at Bldg 272B. Go south on Buena Vista to second stop sign (Dakota). Turn right on Dakota and take second left onto Queenstown Street. Hospital is on the left off Queenstown Street.

Site #37 Golf Course Entomology Shop (Bldg 3622). Turn right onto Patton Road and first right onto Queenstown Street. Hospital is on the left.

Site #16 Shoppette Debris Disposal Area. Follow Patton Road until Queenstown Street appears on left. Take a left onto Queenstown Street. Hospital is to the left.

Site #17 Little Mirror Lake. (Follow Site #16, or) Follow Sheridan Road to Queenstown Street. Take a right onto Queenstown Street. Hospital is on the right.

Site #29 Transformer Storage Area. Follow Saratoga Street to Patton Road. Take a right onto Patton Road and a left onto Queenstown Street. Hospital is on the left.

Site #39 Transformer Near Bldg. 4250. Come back under Route 2. Take left onto Sheridan Road and a right onto Queenstown Street. Hospital is on the right.

Site #10 Construction Debris Area #1. Follow Perimeter Road until it intersects with Hospital Road. Turn left onto Hospital Road and then turn right on Givry Street. Take a right onto Jackson Road and turn left onto Patton Road. Bear right onto Sheridan Road and a right onto Queenstown Street. The hospital is on the left.

Site #11 Construction Debris Area #2. East on Lovell Street until it intersects with Hospital Road. Turn left onto Hospital Road and then turn right on Givry Street. Take a right onto Jackson Road and turn left onto Patton Road. Bear right onto Sheridan Road and a right onto Queenstown Street. The hospital is on the left.

Nashua River Study. Follow Perimeter Road until it intersects with Hospital Road. Turn left onto Hospital Road and then turn right on Givry Street. Take a right onto Jackson Road and turn left onto Patton Road. Bear right onto Sheridan Road and a right onto Queenstown Street. The hospital is on the left.

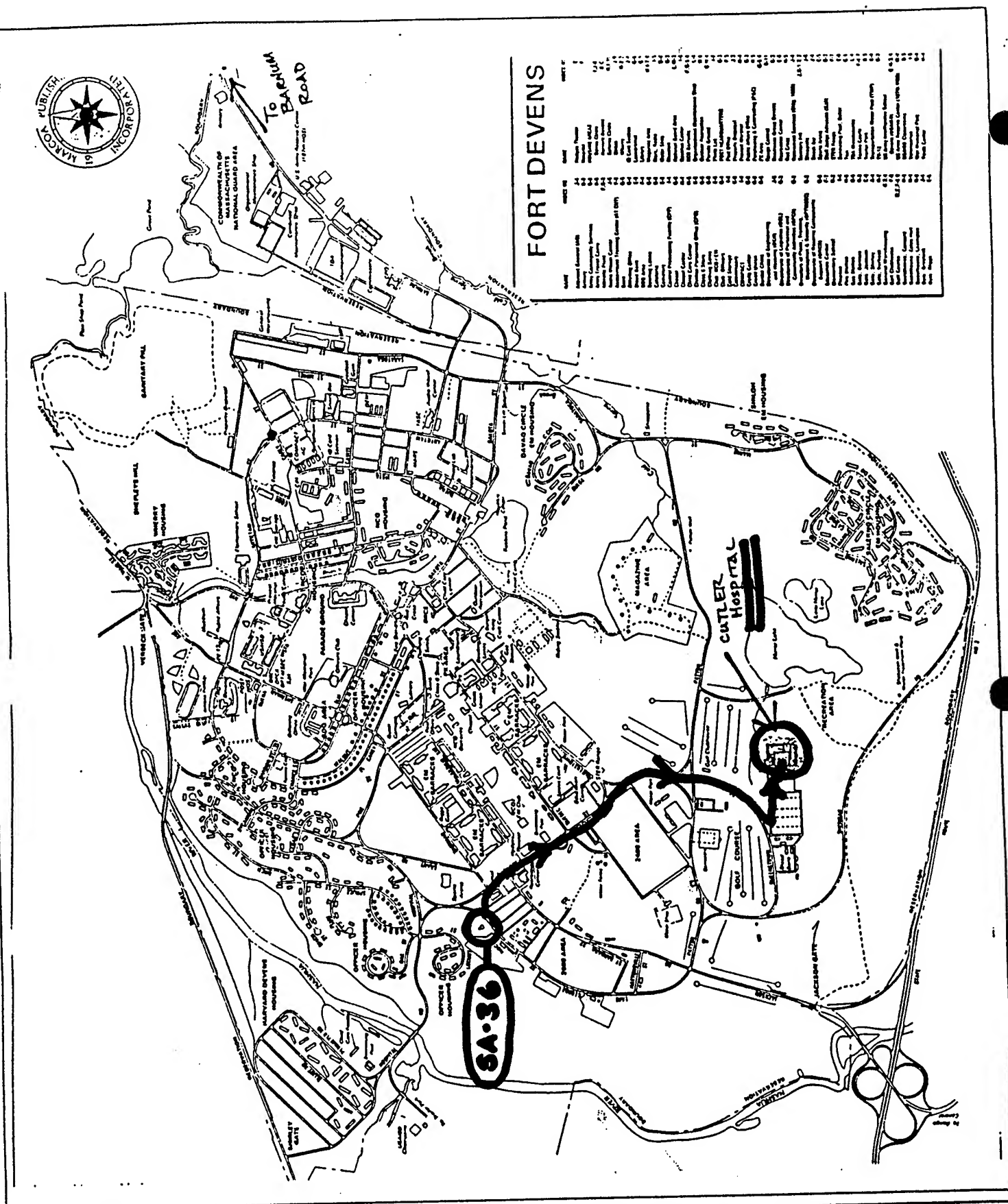


FIGURE 9-1
ROUTES TO PRIMARY HOSPITAL
FORT DEVENS, MASSACHUSETTS

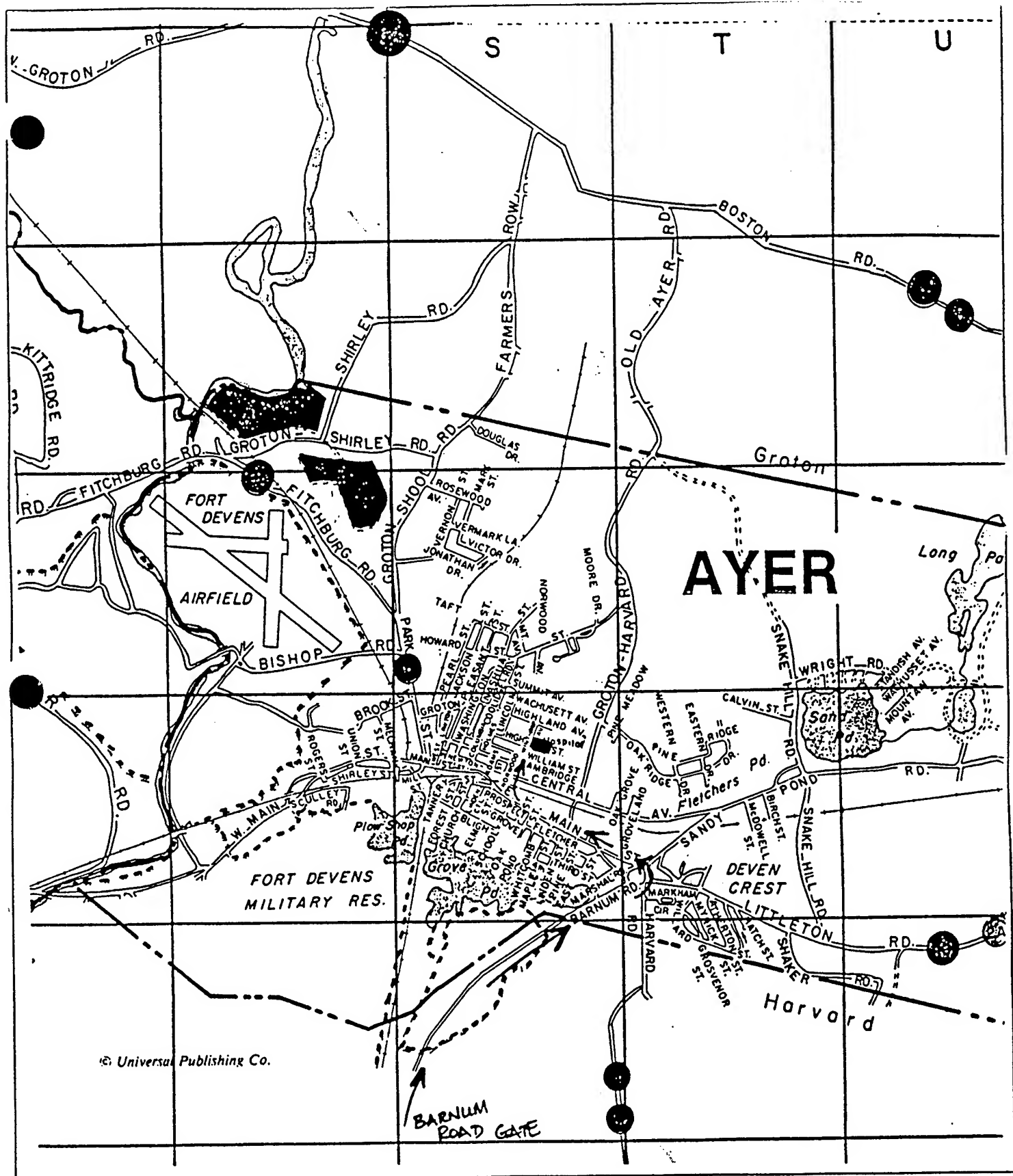


FIGURE 9-2
 ROUTES TO SECONDARY HOSPITAL
 FORT DEVENS, MASSACHUSETTS

**Site-Specific
Health and Safety Plan
Arthur D. Little, Inc.**

This plan is applicable for sites where the work involves unknown or uncharacterized chemical contamination. Please reference the Arthur D. Little Hazardous Waste Operation Health and Safety Program Plan for detail on the overall program. A copy of the most current Arthur D. Little Health and Safety Program Plan for Hazardous Waste Site Operations (April, 1992) and the Fort Devens Main Post Health and Safety Plan shall be available at the site in addition to other applicable documentation.

Job Name Fort Devens Site Investigation **Case No.** 67064

Site Location SA-37, Golf Entomology Shops

Site History SA-37 consists of four buildings (3622, 3627, 3601, and 3606) which have been or are currently used as golf course entomology shops. Building 3606 is under investigation because of its use for pesticide mixing and golf course maintenance activities. Pesticides are currently mixed behind the building on a bermed pad.

Site Description/Nature of Work Collect 20 surface soil samples using a hand auger. The samples will be submitted for lead analysis.

Dig Safe and Other Utilities Notified Site previously cleared during 1993 site investigation; no utilities present.

By Whom _____ **Date** _____

Response _____

File Numbers _____

Primary Level of Protection: Level D+

Contingency Level of Protection: Level C (if action levels are reached).

Emergency Phone Numbers

ADL Health and Safety Office: Primary (800) 677-3000 X6106 (C. Briggs), Alternate (800) 677-3000 X6112 (P. Roy), Alternate (800) 677-3000 X5884 (S. Stricoff)

Ambulance: (508) 769-6911 **Fire:** (508) 796-2220 **Police:** (508) 796-3333

Hospital:

Name Deaconess Nashoba Hospital

Address 200 Groton Road

Hospital Phone Number (508) 772-0200

Attach written directions and a map of the route to the nearest hospital (Attachment 1)

Other: Environmental/H&S - Jim Chambers Phone No. (508) 796-3114

Location of Nearest Phone: Cellular phone in field vehicle

Site Hazards

Chemical Hazards (overview, include source and location of contaminants):

Lead

Representative Chemicals	PEL/TLV/IDLH
<u>Inorganic lead</u>	<u>PEL=0.05 mg/m³ TLV=0.15 mg/m³</u>
	<u>IDLH = 700 mg/m³</u>
<u>Malathion</u>	<u>50 mg/m³</u>
<u>DDT</u>	<u>1 mg/m³</u>
<u>Round-up herbicide (glyphosate)</u>	<u>--</u>

Factors Indicating the Nature of the Potential or Known Contaminants at the Site:

Site History: ☒ Previous Sampling Results: Current Use:

Explain:

Major Routes of Exposure: Primary - Dermal and inhalation; secondary - ingestion (if good hygiene not practiced), ocular (from potential dust generation), and injection (puncture wounds from sharp objects)

Symptoms of Exposure/Potential Health Effects: Dizziness, headache, nausea, euphoria, fatigue, unconsciousness, death

Physical Hazards

If drilling, the general types of hazards associated with a drill rig are present, namely, slips and falls, falling objects, hand, foot and back injuries, etc. If digging test pits, the additional hazards of a swinging backhole bucket, collapse of excavation, etc., exist.

Noise Hazards

The noise associated with operation of a drill rig or other heavy equipment can cause permanent, irreversible hearing loss. "Impact noise," such as that caused by driving a well point or split spoon with a drill rig hammer, is especially damaging. Proper hearing protection (ear muffs or plugs) must be worn when near a source of loud noise.

Fire Hazards: Not anticipated

Electrical Hazards: Overhead power lines and underground power lines

Oxygen Deficiency: Not anticipated

Confined Space Entry: Not applicable, ADL prohibited from this type of work

Radioactive Materials: Not anticipated

Other Hazards: Heat stress, cold stress, environmental hazards (e.g., ticks, insects, etc.)

Personnel Health and Safety Requirements

Medical Monitoring Requirements. Site personnel must be participants in ADL's, or similar, medical monitoring program, and must have had their most recent exam within the previous 12 months. The exam must have indicated no medical restrictions that would inhibit personnel from performing the required work tasks.

Training Requirements. All site personnel must have the current 40 hours or 8 hours (refresher) of relevant health and safety training and/or experience which included coverage of hazard recognition, use of site monitoring instruments, use of personal protective equipment, etc. Personnel must also be oriented to the components of this site-specific plan. Attachment A shall be utilized to document training and physical examination records of site personnel. Attachment B shall be used to document orientation to this site-specific plan.

Site Health and Safety Procedures

Procedures for a Site "Walk-Over":

Practice contamination avoidance at all times; do not step in areas of obvious contamination; do not move unlabelled or unknown containers; do not kneel on ground, floor or other potentially contaminated surfaces; all efforts must be made to minimize contaminating clean work areas; wear proper personal protective equipment.

Procedures for Intrusive Site Work: (Drilling, Test Pits, etc.)

A. Personal Protective Equipment:

1. (a) PPE should be used on the site. (See the PPE Checklist attached to this plan; Attachment 2).
- (b) Type of Respirator Cartridges: Organic vapor/acid gas/HEPA (GMC-H)
2. Additional Personal Protective Equipment: N/A

B. Monitoring Equipment: HNu or Microtip; combustible gas/oxygen meter. The field log book or Attachment C shall be used to document onsite environmental monitoring.

C. Additional Safety Equipment: N/A

D. Health and Safety Work Procedures:

1. Site Briefings: Conduct a daily briefing with site personnel and go over work objectives and the major elements of this plan.

- Tailgate Safety Meeting Form
- In Field Notebook

2. Site Control: Control work areas using any combination of barricade tape, road cones, saw horses, etc. to prohibit the entry of unauthorized personnel; use buddy system.

3. Activity Specific Procedures:

(a) Task(s): Collect soil samples using hand auger

Procedures: Don protective equipment (e.g., Tyvek, gloves, boots, etc.); use good hand augering and sampling procedures; practice contamination avoidance; if dusty conditions arise, upgrade to Level C and continue to monitor

Action Levels: 19.5%-O₂; 10% of LEL; PID-Bkgd = D+; PID-Bkgd to 5 ppm for 5 minutes = C; PID->5 ppm for 5 minutes or peak of 30 ppm or greater-stop operations; RAD->2 mR/hr = stop work; leave area.

4. Personnel and Equipment Decontamination:

- Remove gross contamination from tools, respirator, monitoring equipment, boots, etc. prior to leaving the work-site, using water, paper towels, handi-wipes, etc.
- Either completely decontaminate soiled equipment at the work-site using detergent and water (if possible), or wrap equipment in plastic bag for transport until complete decontamination is possible.
- Always follow established personal decontamination procedures and remove contaminated gloves, Tyvek suits, used cartridges, paper towels, etc. by placing in a plastic bag and arrange for proper disposal.
- Wash hands and face thoroughly with soap and water before lunch or coffee breaks, and as soon as practicable after finishing work for the day.
- Additional Decontamination: Follow decontamination procedures in the program plan if more extensive decontamination is needed.

Emergency Procedures

Personal Injury. If authorized, administer appropriate first aid. The injured may need to be transported to the nearest hospital. If possible, notify hospital in advance of incoming patient and nature of injury. If there is a question about whether it is safe to move the victim, DO NOT move the victim - instead, make him/her as comfortable as possible, and summon emergency assistance.

Chemical Exposure. If site personnel show signs of inhalation exposure, retreat to fresh air for recovery. If symptoms warrant, bring the injured to the nearest hospital for observation, and discontinue work at that location and consult with H&S representative.

In case of skin or eye irritation due to chemical contact, wash affected skin with soap and water, or flush eyes with generous amount of water. If irritation is serious, seek medical attention.

Fire. If the fire can be easily contained and extinguished, do so with a portable fire extinguisher. If explosion risk is present, do not attempt to extinguish - evacuate all personnel to a safe area and call the fire department (508-796-2220).

Spills. If safe to do so, contain the spill if materials and equipment are available. If these materials are not available or the release is beyond the capabilities of site personnel, contact local emergency responders who are trained and equipped to control and cleanup the release (508-796-2220).

Important Note: If site observations, sampling results, or any other information indicates the presence of chemical contaminants other than those specified herein, this health and safety plan becomes void, and a new plan must be prepared and approved!

The field logbook or Attachment D shall be completed to document daily health and safety activities in the study areas.

Project Manager Mark Offenberger 8/4/94
Health & Safety Plan Prepared By Mary Greenwood Date 8/4/94
Health & Safety Plan Approved By Cory Briggs Date 2/8/94

Arthur D. Little, Inc. PPE Checklist

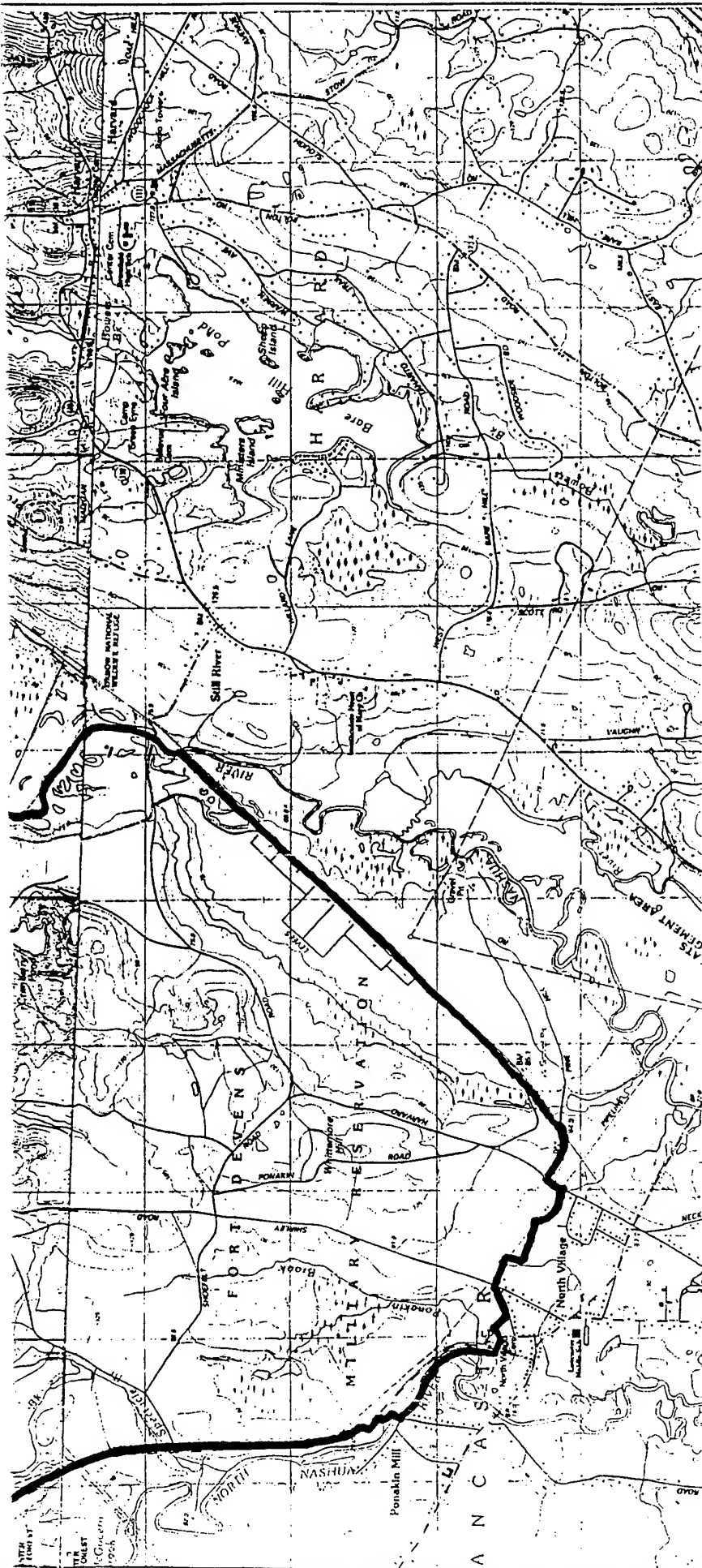
- ☒ 1. MSA Ultratwin full-face air-purifying respirator, in a protective plastic bag
- ☒ 2. Nose cup insert for MSA Ultratwin respirator
- ☐ 3. Ear-muff set which fits into hardhat
- ☒ 4. Optional: Eyeglass kit for MSA Ultratwin respirator
- ☒ 5. MSA cartridges for respirator OV/AG/HEPA (GMC-H)
- ☐ 6. Protective lenses cover for MSA Ultratwin respirator
- ☐ 7. Disposable ear plugs
- ☒ 8. Silvershield gloves
- ☐ 9. Natural rubber gloves
- ☒ 10. Nitrile gloves
- ☒ 11. White Tyvek suit
- ☐ 12. Saranex Tyvek suit
- ☒ 13. Safety glasses with side shields
- ☐ 14. Goggles
- ☒ 15. Plastic disposal bags
- ☐ 16. Hardhat
- ☒ 17. Duct tape
- ☐ 18. Other (list below)



Arthur D Little

①





PREPARED FOR:

USAEC

DATE:

JAN. 1993

SCALE:

1:25000

DWG. NO.:

BORDER.DWG

SOURCE: USGS TOPOGRAPHIC 7.5-MINUTE SERIES;
AYER, MASSACHUSETTS, 1988, AND
HUDSON, MASSACHUSETTS, 1988

TITLE:

Figure 6-2:

REGIONAL SETTING OF FORT
DEVENS

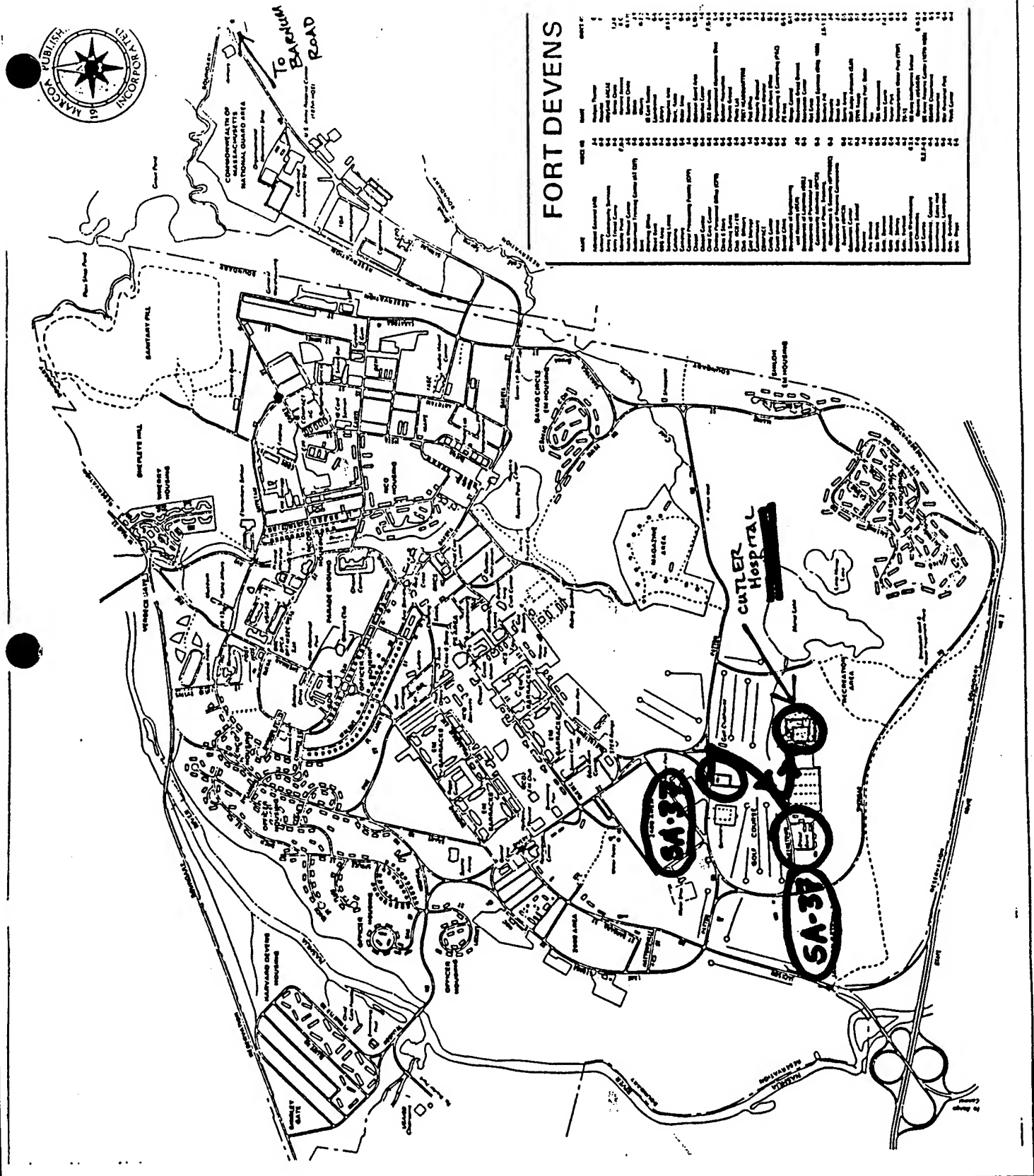


FIGURE 9-1
ROUTES TO PRIMARY HOSPITAL
FORT DEVENS, MASSACHUSETTS

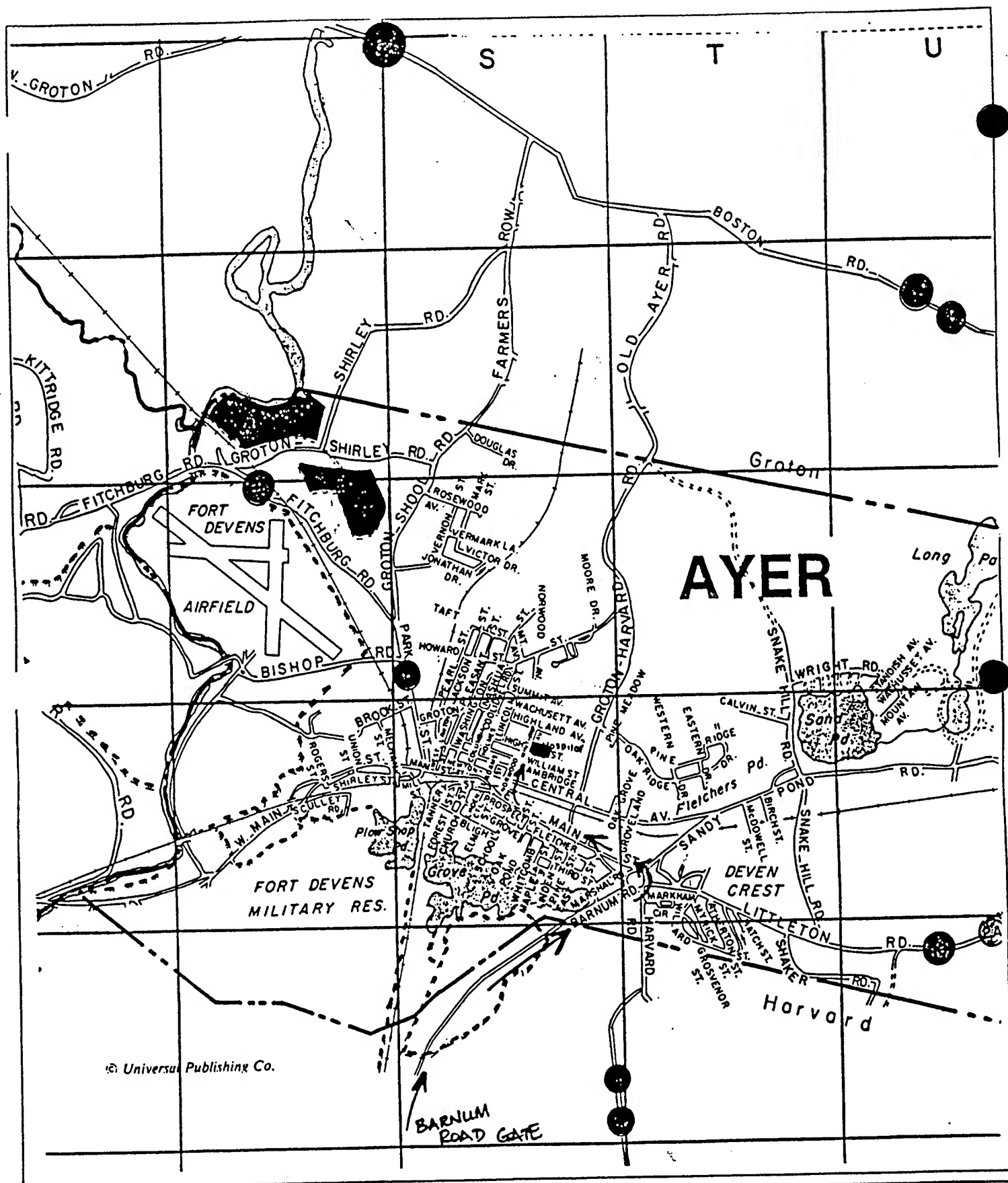


FIGURE 9
ROUTES TO SECONDARY HOSPITAL
FORT DEVENS, MASSACHUSETTS

**Site-Specific
Health and Safety Plan
Arthur D. Little, Inc.**

This plan is applicable for sites where the work involves unknown or uncharacterized chemical contamination. Please reference the Arthur D. Little Hazardous Waste Operation Health and Safety Program Plan for detail on the overall program. A copy of the most current Arthur D. Little Health and Safety Program Plan for Hazardous Waste Site Operations (April, 1992) and the Fort Devens Main Post Health and Safety Plan shall be available at the site in addition to other applicable documentation.

Job Name Fort Devens Site Investigation **Case No.** 67064

Site Location SA16, Shoppette Debris Disposal Area

Site History The Shoppette Debris Disposal Area is an approximately 1 acre parcel of land located immediately north of a inactive gravel pit where some household debris and rubbish may have been dumped during temporary closure of the landfills.

Site Description/Nature of Work The scope of work for this area includes: records review; conducting a geophysical survey over the entire site to identify any anomalous readings which may represent buried debris; and excavate six test pits with one soil sample per pit to visually and chemically confirm the presence or absence of debris.

Conduct geophysics survey and site inspection; excavate six test pits and collect six soil samples.

A site plan is provided in the Work Plan for the Fort Devens Main Post SI.

Dig Safe and Other Utilities Notified _____

By Whom _____ **Date** _____

Response _____

File Numbers _____

Primary Level of Protection: Level D+

Contingency Level of Protection: Level C (if dusting and odors are noted and/or action levels are reached).

Emergency Phone Numbers

ADL Health and Safety Office: Primary 800-677-3000 x6106 (C. Briggs), Alternate 800-677-3000 x6112 (P. Roy), Alternate 800-677-3000 x5884 (S. Stricoff)

Ambulance: 769-6911 **Fire:** 796-2220 **Police:** 796-3333

Hospital:

Name Culter Army Hospital

Address Building 3654 - Fort Devens

Hospital Phone Number 796-6911

Attach written directions and a map of the route to the nearest hospital (Attachment 1)

Other: Nashoba Community Hospital **Phone No.** 772-2657

Environmental/H&S - Bill Mullen **Phone No.** 796-3114

Location of Nearest Phone: _____

Site Hazards

Chemical Hazards (overview, include source and location of contaminants):

Asbestos insulation may have been deposited here; other debris could be encountered.

Representative Chemicals	PEL/TLV/IDLH
<u>Asbestos (various)</u>	<u>0.2-2 f/cc</u>

Factors Indicating the Nature of the Potential or Known Contaminants at the Site:

Site History: ✓ **Previous Sampling Results:** _____ **Current Use:** _____

Explain: _____

Major Routes of Exposure: Dermal and inhalation primarily; ingestion if good hygiene not practiced; potential eye exposure from dust generation; potential injection from cuts caused by sharp objects.

Symptoms of Exposure/Potential Health Effects: See Attachment E.

Note: Pesticides and herbicides have characteristic odors but cannot be easily monitored with direct reading instruments. Upgrade a Level of Protection when in doubt

Physical Hazards

If drilling, the general types of hazards associated with a drill rig are present, namely, slips and falls, falling objects, hand, foot and back injuries, etc. If digging test pits, the additional hazards of a swinging backhole bucket, collapse of excavation, etc., exist.

Noise Hazards

The noise associated with operation of a drill rig or other heavy equipment can cause permanent, irreversible hearing loss. "Impact noise," such as that caused by driving a well point or split spoon with a drill rig hammer, is especially damaging. Proper hearing protection (ear muffs or plugs) must be worn when near a source of loud noise.

Fire Hazards: Fuel tank of excavation equipment; decontamination chemicals, underground fuel/gas lines or tanks; hitting buried containers; possible methane generation.

Electrical Hazards: Live electrical circuits in building, overhead lines, potential exposed circuit boxes and wires; underground lines.

Oxygen Deficiency: Could result from degradation of buried debris (also methane generation).

Confined Space Entry: Entry into trenches is prohibited.

Radioactive Materials: Not anticipated but a general screening to be conducted.

Other Hazards: Heat stress, cold stress, environmental hazards (e.g., ticks, insects, etc.).

Personnel Health and Safety Requirements

Medical Monitoring Requirements. Site personnel must be participants in ADL's, or similar, medical monitoring program, and must have had their most recent exam within the previous 12 months. The exam must have indicated no medical restrictions that would inhibit personnel from performing the required work tasks.

Training Requirements. All site personnel must have the current 40 hours or 8 hours (refresher) of relevant health and safety training and/or experience which included coverage of hazard recognition, use of site monitoring instruments, use of personal protective equipment, etc. Personnel must also be oriented to the components of this site-specific plan. Attachment A shall be utilized to document training and physical examination records of site personnel. Attachment B shall be used to document orientation to this site-specific plan.

Site Health and Safety Procedures

Procedures for a Site "Walk-Over":

Practice contamination avoidance at all times; do not step in areas of obvious contamination; do not move unlabelled or unknown containers; do not kneel on ground, floor or other potentially contaminated surfaces; all efforts must be made to minimize contaminating clean work areas; wear proper personal protective equipment.

Procedures for Intrusive Site Work: (Drilling, Test Pits, etc.)

A. Personal Protective Equipment:

1. (a) PPE should be used on the site. (See the PPE Checklist attached to this plan; Attachment 2).

(b) Type of Respirator Cartridges: Organic vapor/acid gas/HEPA (GMC-H)

2. Additional Personal Protective Equipment: _____

B. Monitoring Equipment: HNu or Microtip; combustible gas/oxygen meter, Draeger colormetric tubes. The field log book or Attachment C shall be used to document onsite environmental monitoring

C. Additional Safety Equipment: N/A

D. Health and Safety Work Procedures:

1. Site Briefings: Conduct a daily briefing with site personnel and go over work objectives and the major elements of this plan.

- Tailgate Safety Meeting Form
- In Field Notebook

2. Site Control: Control work areas using any combination of barricade tape, road cones, saw horses, etc. to prohibit the entry of unauthorized personnel; use buddy system.

3. Activity Specific Procedures:

(a) Task(s): Geophysics Survey and Site Investigation.

Procedures: Don protective equipment (e.g., hardhats, standard Tyvek safety glasses, gloves, boots); practice contamination avoidance; watch for uneven walking surfaces.

Action Levels: N/A

3. (b) Task(s): Excavate six test pits and collect six samples.

Procedures: Don protective equipment (especially hardhats); conduct all excavations in accordance with OSHA procedures; do not stand near the edge of the trench; do not enter the excavation; periodically monitor the area for airborne contamination; if odors are noted, upgrade to Level C and continue monitoring; cordon off the area with barricade tape, road cones, etc.; keep unauthorized personnel from the work area.

Action Levels: 19.5%-O₂; 10% of LEL; PID-Bkgd = D+; PID-Bkgd to 5 ppm for 5 minutes = C; PID->5 ppm for 5 minutes or peak of 30 ppm or greater-stop operations; RAD->2 mR/hr = stop work; leave area

3. (c) Task(s): N/A

Procedures: N/A

Action Levels: N/A

4. Personnel and Equipment Decontamination:

- Remove gross contamination from tools, respirator, monitoring equipment, boots, etc. prior to leaving the work-site, using water, paper towels, hand-wipes, etc.
- Either completely decontaminate soiled equipment at the work-site using detergent and water (if possible), or wrap equipment in plastic bag for transport until complete decontamination is possible.
- Always follow established personal decontamination procedures and remove contaminated gloves, Tyvek suits, used cartridges, paper towels, etc. by placing in a plastic bag and arrange for proper disposal.
- Wash hands and face thoroughly with soap and water before lunch or coffee breaks, and as soon as practicable after finishing work for the day.
- Additional Decontamination: Follow decontamination procedures in the program plan if more extensive decontamination is needed.

Emergency Procedures

Personal Injury. If authorized, administer appropriate first aid. The injured may need to be transported to the nearest hospital. If possible, notify hospital in advance of incoming patient and nature of injury. If there is a question about whether it is safe to move the victim, **DO NOT** move the victim - instead, make him/her as comfortable as possible, and summon emergency assistance.

Chemical Exposure. If site personnel show signs of inhalation exposure, retreat to fresh air for recovery. If symptoms warrant, bring the injured to the nearest hospital for observation, and discontinue work at that location and consult with H&S representative.

In case of skin or eye irritation due to chemical contact, wash affected skin with soap and water, or flush eyes with generous amount of water. If irritation is serious, seek medical attention.

Fire. If the fire can be easily contained and extinguished, do so with a portable fire extinguisher. If explosion risk is present, do not attempt to extinguish - evacuate all personnel to a safe area and call the fire department (796-2220).

Spills. If safe to do so, contain the spill if materials and equipment are available. If these materials are not available or the release is beyond the capabilities of site personnel, contact local emergency responders who are trained and equipped to control and cleanup the release (796-2220).

Important Note: If site observations, sampling results, or any other information indicates the presence of chemical contaminants other than those specified herein, this health and safety plan becomes void, and a new plan must be prepared and approved!

The field logbook or Attachment D shall be completed to document daily health and safety activities in the study areas.

Project Manager _____

Health & Safety Plan Prepared By _____ **Date** _____

Health & Safety Plan Approved By _____ **Date** _____

Arthur D. Little, Inc. PPE Checklist

- ☒ 1. MSA Ultratwin full-face air-purifying respirator, in a protective plastic bag
- ☒ 2. Nose cup insert for MSA Ultratwin respirator
- ☒ 3. Ear-muff set which fits into hardhat
- ☒ 4. Optional: Eyeglass kit for MSA Ultratwin respirator
- ☒ 5. MSA cartridges for respirator _____
- ☒ 6. Protective lenses cover for MSA Ultratwin respirator
- ☒ 7. Disposable ear plugs
- ☒ 8. Silvershield gloves
- ☐ 9. Natural rubber gloves
- ☒ 10. Nitrile gloves
- ☐ 11. Polyethylene Tyvek suit
- ☐ 12. Saranex Tyvek suit
- ☒ 13. Safety glasses with side shields
- ☒ 14. Goggles
- ☒ 15. Plastic disposal bags
- ☒ 16. Hardhat
- ☒ 17. Duct tape
- ☒ 18. Other (list below)
 - Standard Tyvek for geophysical survey.
 - Standard Tyvek for sampling test pits; possible upgrade to coated Tyvek if needed.

Site-Specific Directions to Cutler Army Hospital

Site #33 DEH Entomology Shop (Bldg 262). Go south on Buena Vista to second stop sign (Dakota). Turn right on Dakota and take second left onto Queenstown Street. Hospital is on the left off Queenstown Street.

Site #34 Former DEH Entomology Shop at Bldg 245. Go south on Buena Vista to second stop sign (Dakota). Turn right on Dakota and take second left onto Queenstown Street. Hospital is on the left off Queenstown Street.

Site #35 Former DEH Entomology Shop at Bldg 254. Go south on Buena Vista to second stop sign (Dakota). Turn right on Dakota and take second left onto Queenstown Street. Hospital is on the left off Queenstown Street.

Site #36 Former DEH Entomology Shop at Bldg 272B. Go south on Buena Vista to second stop sign (Dakota). Turn right on Dakota and take second left onto Queenstown Street. Hospital is on the left off Queenstown Street.

Site #37 Golf Course Entomology Shop (Bldg 3622). Turn right onto Patton Road and first right onto Queenstown Street. Hospital is on the left.

Site #16 Shoppette Debris Disposal Area. Follow Patton Road until Queenstown Street appears on left. Take a left onto Queenstown Street. Hospital is to the left.

Site #17 Little Mirror Lake. (Follow Site #16, or) Follow Sheridan Road to Queenstown Street. Take a right onto Queenstown Street. Hospital is on the right.

Site #29 Transformer Storage Area. Follow Saratoga Street to Patton Road. Take a right onto Patton Road and a left onto Queenstown Street. Hospital is on the left.

Site #39 Transformer Near Bldg. 4250. Come back under Route 2. Take left onto Sheridan Road and a right onto Queenstown Street. Hospital is on the right.

Site #10 Construction Debris Area #1. Follow Perimeter Road until it intersects with Hospital Road. Turn left onto Hospital Road and then turn right on Givry Street. Take a right onto Jackson Road and turn left onto Patton Road. Bear right onto Sheridan Road and a right onto Queenstown Street. The hospital is on the left.

Site #11 Construction Debris Area #2. East on Lovell Street until it intersects with Hospital Road. Turn left onto Hospital Road and then turn right on Givry Street. Take a right onto Jackson Road and turn left onto Patton Road. Bear right onto Sheridan Road and a right onto Queenstown Street. The hospital is on the left.

Nashua River Study. Follow Perimeter Road until it intersects with Hospital Road. Turn left onto Hospital Road and then turn right on Givry Street. Take a right onto Jackson Road and turn left onto Patton Road. Bear right onto Sheridan Road and a right onto Queenstown Street. The hospital is on the left.

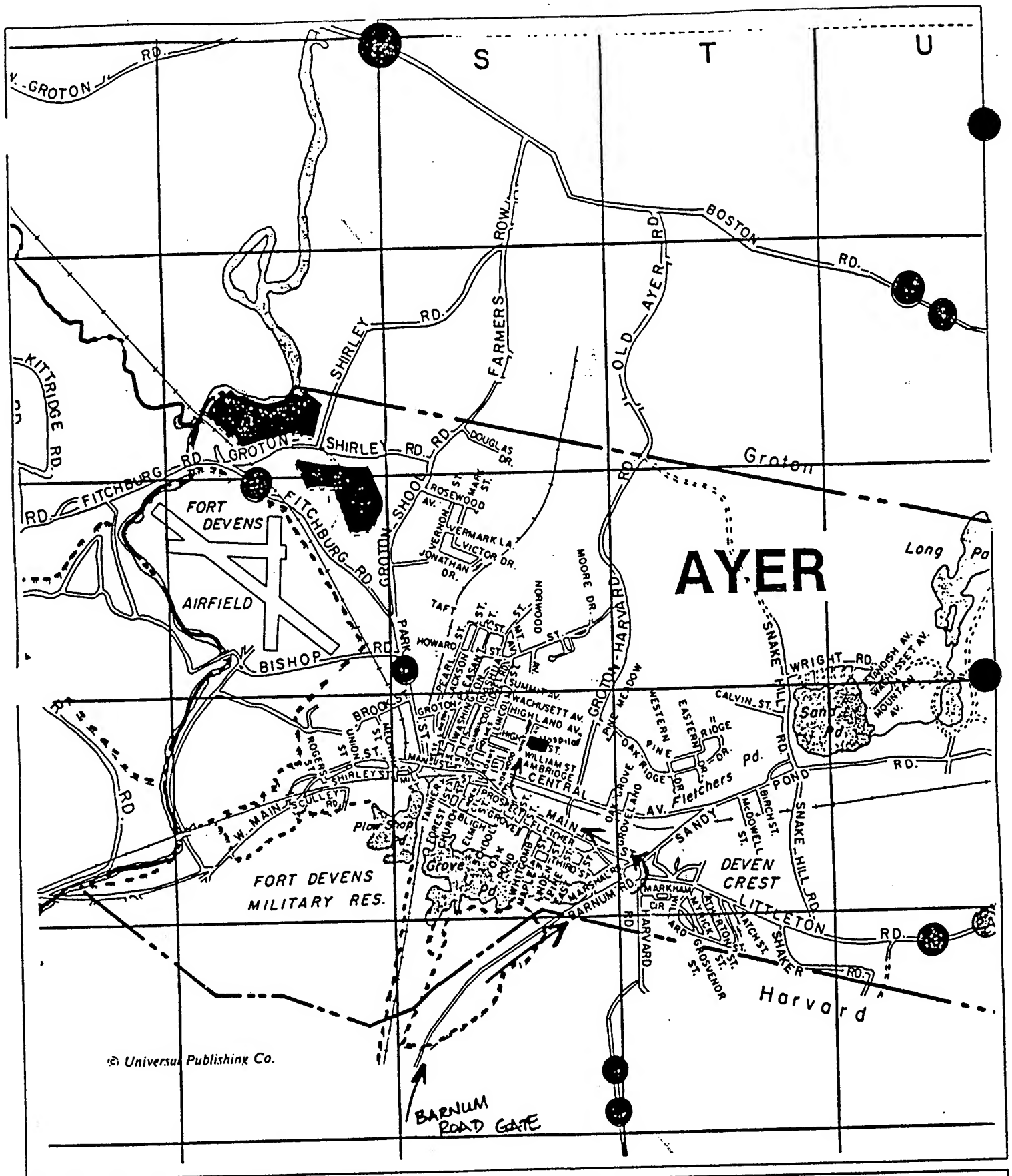


FIGURE 1
ROUTES TO SECONDARY HOSPITAL
FORT DEVENS, MASSACHUSETTS

**Site-Specific
Health and Safety Plan
Arthur D. Little, Inc.**

This plan is applicable for sites where the work involves unknown or uncharacterized chemical contamination. Please reference the Arthur D. Little Hazardous Waste Operation Health and Safety Program Plan for detail on the overall program. A copy of the most current Arthur D. Little Health and Safety Program Plan for Hazardous Waste Site Operations (April, 1992) and the Fort Devens Main Post Health and Safety Plan shall be available at the site in addition to other applicable documentation.

Job Name Fort Devens Site Investigation **Case No.** 67064

Site Location SA-17, Mirror Lake and Little Mirror Lake

Site History Grenades may have been disposed of in the lakes during the WWII era.

Site Description/Nature of Work Oversight of geophysical surveys of the lake bottoms of both lakes will be conducted. The actual geophysical survey will be performed by a geophysical subcontractor. Sediment and surface water samples will be collected from each lake; diving and inspection of lake bottom for UXO may be performed; however this work will be performed by a subcontractor specializing in diving and handling UXO. See Appendix E for UXO subcontractor Health and Safety Plan.

Dig Safe and Other Utilities Notified N/A

By Whom _____ **Date** _____

Response _____

File Numbers _____

Primary Level of Protection: See subcontractor H&S Plan (Attachment H)

Contingency Level of Protection: Level C (if action levels are reached)

Emergency Phone Numbers

ADL Health and Safety Office: Primary 800-677-3000 x6106 (C. Briggs), Alternate x6112 (P. Roy), Alternate x5884 (S. Stricoff)

Ambulance: (508) 769-6911 **Fire:** (508) 796-2220 **Police:** (508) 796-3333

Hospital:

Name Deaconess Nashoba Hospital

Address 200 Groton Road

Hospital Phone Number (508) 772-0200

Attach written directions and a map of the route to the nearest hospital (Attachment 1)

Other: Environmental/H&S - Jim Chambers Phone No. (508) 796-3114

Location of Nearest Phone: Cellular phone in field vehicle

Site Hazards

Chemical Hazards (overview, include source and location of contaminants):

Unexploded ordnance, pesticides, metals

Representative Chemicals	PEL/TLV/IDLH
<u>TNT</u>	<u>1.5 mg/m³ (0.5 mg/m³)</u>
<u>RDX</u>	
<u>Malathion</u>	<u>10 mg/m³</u>
<u>DDT</u>	<u>1 mg/m³</u>

Factors Indicating the Nature of the Potential or Known Contaminants at the Site:

Site History: ☒ Previous Sampling Results: _____ Current Use: _____

Explain: _____

Major Routes of Exposure: Primary - The primary hazard is potential explosion of ordnance; secondary - Drowning from faulty diving equipment and injection (puncture wounds from sharp objects)

Symptoms of Exposure/Potential Health Effects: Dizziness, headache, nausea, euphoria, fatigue, unconsciousness, death, blunt trauma (by chemical exposure and/or explosion of UXO)

Physical Hazards

If drilling, the general types of hazards associated with a drill rig are present, namely, slips and falls, falling objects, hand, foot and back injuries, etc. If digging test pits, the additional hazards of a swinging backhole bucket, collapse of excavation, etc., exist.

Noise Hazards

The noise associated with operation of a drill rig or other heavy equipment can cause permanent, irreversible hearing loss. "Impact noise," such as that caused by driving a well point or split spoon with a drill rig hammer, is especially damaging. Proper hearing protection (ear muffs or plugs) must be worn when near a source of loud noise.

Fire Hazards: Not anticipated

Electrical Hazards: Overhead power lines and underground power lines

Oxygen Deficiency: Not anticipated

Confined Space Entry: Applicable only to contractor's work; ADL prohibited from this type of work

Radioactive Materials: Not anticipated

Other Hazards: Heat stress, cold stress, environmental hazards (e.g., ticks, insects, etc.). UXO subcontractor must follow all provisions of their H&S plan.

Personnel Health and Safety Requirements

Medical Monitoring Requirements. Site personnel must be participants in ADL's, or similar, medical monitoring program, and must have had their most recent exam within the previous 12 months. The exam must have indicated no medical restrictions that would inhibit personnel from performing the required work tasks.

Training Requirements. All site personnel must have the current 40 hours or 8 hours (refresher) of relevant health and safety training and/or experience which included coverage of hazard recognition, use of site monitoring instruments, use of personal protective equipment, etc. Personnel must also be oriented to the components of this site-specific plan. Attachment A shall be utilized to document training and physical examination records of site personnel. Attachment B shall be used to document orientation to this site-specific plan.

Site Health and Safety Procedures

Procedures for a Site "Walk-Over":

N/A, UXO subcontractor procedures dictate on site activities.

Procedures for Intrusive Site Work: (Drilling, Test Pits, etc.)

A. Personal Protective Equipment:

1. (a) PPE should be used on the site. (See the PPE Checklist attached to this plan; Attachment 2).

(b) Type of Respirator Cartridges: N/A

2. Additional Personal Protective Equipment: N/A

B. *Monitoring Equipment:* HNu or microtip; combustible gas/oxygen meter. The field log book or Attachment C shall be used to document onsite environmental monitoring.

C. *Additional Safety Equipment:* USCG-approved PFD will be worn during boat activities and PRD with rubber chest waders for non-boat activities.

D. *Health and Safety Work Procedures:*

1. Site Briefings: Conduct a daily briefing with site personnel and go over work objectives and the major elements of this plan.

- Tailgate Safety Meeting Form
- In Field Notebook

2. Site Control: Control work area using any combination of barricade tape, road cones, saw horses, etc. to prohibit the entry of unauthorized personnel; use the buddy system.

3. Activity Specific Procedures:

(a) Task(s): Geophysical surveys

Procedures: See Attachment E

Action Levels: See Attachment E

(b) Task(s): Collection of surface water and sediment samples

Procedures: See Attachment E

Action Levels: See Attachment E

4. Personnel and Equipment Decontamination:

- Remove gross contamination from tools, respirator, monitoring equipment, boots, etc. prior to leaving the work-site, using water, paper towels, hand-wipes, etc.
- Either completely decontaminate soiled equipment at the work-site using detergent and water (if possible), or wrap equipment in plastic bag for transport until complete decontamination is possible.
- Always follow established personal decontamination procedures and remove contaminated gloves, Tyvek suits, used cartridges, paper towels, etc. by placing in a plastic bag and arrange for proper disposal.
- Wash hands and face thoroughly with soap and water before lunch or coffee breaks, and as soon as practicable after finishing work for the day.

- Additional Decontamination: Follow decontamination procedures in the program plan if more extensive decontamination is needed.

Emergency Procedures

Personal Injury. If authorized, administer appropriate first aid. The injured may need to be transported to the nearest hospital. If possible, notify hospital in advance of incoming patient and nature of injury. If there is a question about whether it is safe to move the victim, DO NOT move the victim - instead, make him/her as comfortable as possible, and summon emergency assistance.

Chemical Exposure. If site personnel show signs of inhalation exposure, retreat to fresh air for recovery. If symptoms warrant, bring the injured to the nearest hospital for observation, and discontinue work at that location and consult with H&S representative.

In case of skin or eye irritation due to chemical contact, wash affected skin with soap and water, or flush eyes with generous amount of water. If irritation is serious, seek medical attention.

Fire. If the fire can be easily contained and extinguished, do so with a portable fire extinguisher. If explosion risk is present, do not attempt to extinguish - evacuate all personnel to a safe area and call the fire department (508-796-2220).

Spills. If safe to do so, contain the spill if materials and equipment are available. If these materials are not available or the release is beyond the capabilities of site personnel, contact local emergency responders who are trained and equipped to control and cleanup the release (508-796-2220).

Important Note: If site observations, sampling results, or any other information indicates the presence of chemical contaminants other than those specified herein, this health and safety plan becomes void, and a new plan must be prepared and approved!

The field logbook or Attachment D shall be completed to document daily health and safety activities in the study areas.

Project Manager Mark O. Hennege 8/4/94
Health & Safety Plan Prepared By Maryd. Greenwood Date 8/4/94
Health & Safety Plan Approved By _____ Date _____

Arthur D. Little, Inc. PPE Checklist

- ☐ 1. MSA Ultratwin full-face air-purifying respirator, in a protective plastic bag
- ☐ 2. Nose cup insert for MSA Ultratwin respirator
- ☐ 3. Ear-muff set which fits into hardhat
- ☐ 4. Optional: Eyeglass kit for MSA Ultratwin respirator
- ☐ 5. MSA cartridges for respirator OV/AG/HEPA (GMC-H)
- ☐ 6. Protective lenses cover for MSA Ultratwin respirator
- ☐ 7. Disposable ear plugs
- ☐ 8. Silvershield gloves
- ☐ 9. Natural rubber gloves
- ☐ 10. Nitrile gloves
- ☐ 11. Polyethylene Tyvek suit
- ☐ 12. Saranex Tyvek suit
- ☐ 13. Safety glasses with side shields
- ☐ 14. Goggles
- ☐ 15. Plastic disposal bags
- ☐ 16. Hardhat
- ☐ 17. Duct tape
- ☒ 18. Other (list below)

• See Appendix E

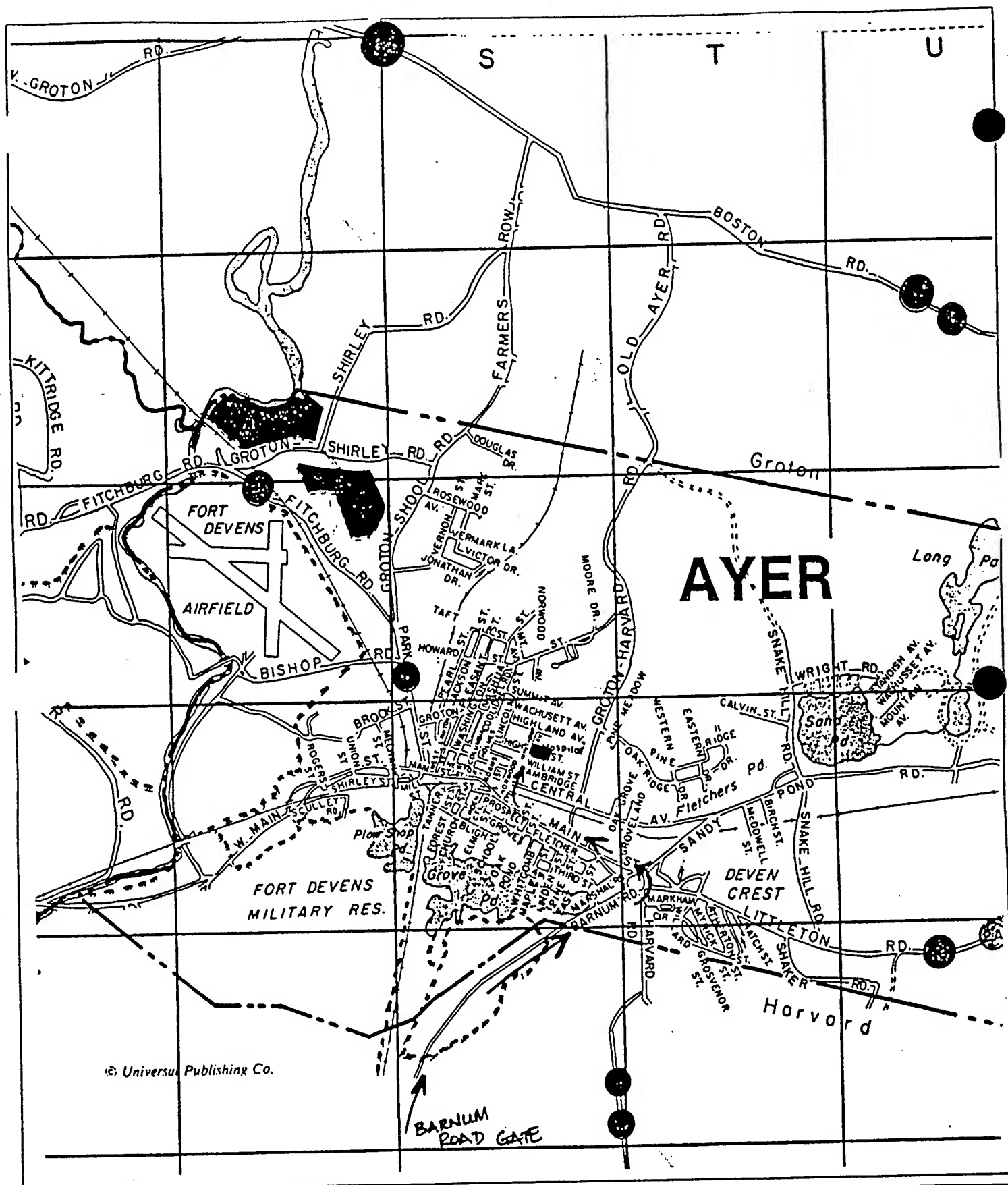


FIGURE
ROUTES TO SECONDARY HOSPITAL
FORT DEVENS, MASSACHUSETTS

**Site-Specific
Health and Safety Plan
Arthur D. Little, Inc.**

This plan is applicable for sites where the work involves unknown or uncharacterized chemical contamination. Please reference the Arthur D. Little Hazardous Waste Operation Health and Safety Program Plan for detail on the overall program. A copy of the most current Arthur D. Little Health and Safety Program Plan for Hazardous Waste Site Operations (April, 1992) and the Fort Devens Main Post Health and Safety Plan shall be available at the site in addition to other applicable documentation.

Job Name Fort Devens Site Investigation **Case No.** 67064

Site Location SA29, Transformer Storage Area

Site History This study area is located along the west central portion of the Main Post and includes Building 1438 which is used for storage of electrical transformers and an asphalt overflow pad for transformer storage when Building 1438 is full.

Site Description/Nature of Work The scope of work for this investigation includes: records review; surface soil samples surface soil samples and asphalt samples from the paved portion of the overflow pad.

A site plan is provided in the Work Plan for the Fort Devens Main Post SI.

Dig Safe and Other Utilities Notified _____

By Whom _____ **Date** _____

Response _____

File Numbers _____

Primary Level of Protection: Level D+

Contingency Level of Protection: Level C (if dusting and odors are noted and/or action levels are reached).

Emergency Phone Numbers

ADL Health and Safety Office: Primary 800-677-3000 x6106 (C. Briggs), Alternate 800-677-3000 x6112 (P. Roy), Alternate 800-677-3000 x5884 (S. Stricoff)

Ambulance: 769-6911 **Fire:** 796-2220 **Police:** 796-3333

Hospital:

Name Culter Army Hospital

Address Building 3654 - Fort Devens

Hospital Phone Number 796-6911

Attach written directions and a map of the route to the nearest hospital (Attachment 1)

Other: Nashoba Community Hospital **Phone No.** 772-2657

Environmental/H&S - Bill Mullen **Phone No.** 796-3114

Location of Nearest Phone: _____

Site Hazards

Chemical Hazards (overview, include source and location of contaminants):

PCBs, Petroleum hydrocarbons, trichlorobenzene.

Representative Chemicals	PEL/TLV/IDLH
<u>Aroclor 1260</u>	<u>0.5 mg/m³</u>
<u>Petroleum hydrocarbon</u>	<u>100 ppm</u>
<u>Trichlorobenzene</u>	<u>5 ppm (ceiling)</u>
_____	_____

Factors Indicating the Nature of the Potential or Known Contaminants at the Site:

Site History: ☒ _____ **Previous Sampling Results:** ☒ _____ **Current Use:** _____

Explain: _____

Major Routes of Exposure: Dermal and inhalation primarily; ingestion if good hygiene not practiced; potential eye exposure from dust generation; potential injection from cuts caused by sharp objects.

Symptoms of Exposure/Potential Health Effects: See Attachment E

Note: Pesticides and herbicides have characteristic odors but cannot be easily monitored with direct reading instruments. Upgrade a Level of Protection when in doubt.

Physical Hazards

If drilling, the general types of hazards associated with a drill rig are present, namely, slips and falls, falling objects, hand, foot and back injuries, etc. If digging test pits, the additional hazards of a swinging backhole bucket, collapse of excavation, etc., exist.

Noise Hazards

The noise associated with operation of a drill rig or other heavy equipment can cause permanent, irreversible hearing loss. "Impact noise," such as that caused by driving a well point or split spoon with a drill rig hammer, is especially damaging. Proper hearing protection (ear muffs or plugs) must be worn when near a source of loud noise.

Fire Hazards: Solvents used for decontamination.

Electrical Hazards: Electrical cord and shorts (improper grounding) of chipping hammer.

Oxygen Deficiency: Not anticipated.

Confined Space Entry: N/A

Radioactive Materials: Not anticipated but a general screening to be conducted.

Other Hazards: Heat stress, cold stress, environmental hazards (e.g., ticks, insects, etc.) vibration.

Personnel Health and Safety Requirements

Medical Monitoring Requirements. Site personnel must be participants in ADL's, or similar, medical monitoring program, and must have had their most recent exam within the previous 12 months. The exam must have indicated no medical restrictions that would inhibit personnel from performing the required work tasks.

Training Requirements. All site personnel must have the current 40 hours or 8 hours (refresher) of relevant health and safety training and/or experience which included coverage of hazard recognition, use of site monitoring instruments, use of personal protective equipment, etc. Personnel must also be oriented to the components of this site-specific plan. Attachment A shall be utilized to document training and physical examination records of site personnel. Attachment B shall be used to document orientation to this site-specific plan.

Site Health and Safety Procedures

Procedures for a Site "Walk-Over":

Practice contamination avoidance at all times; do not step in areas of obvious contamination; do not move unlabelled or unknown containers; do not kneel on ground, floor or other potentially contaminated surfaces; all efforts must be made to minimize contaminating clean work areas; wear proper personal protective equipment.

Procedures for Intrusive Site Work: (Drilling, Test Pits, etc.)

A. Personal Protective Equipment:

1. (a) PPE should be used on the site. (See the PPE Checklist attached to this plan; Attachment 2).

(b) Type of Respirator Cartridges: Organic vapor/acid gas/HEPA (GMC-H)
2. Additional Personal Protective Equipment: _____

B. Monitoring Equipment: HNu or Microtip; combustible gas/oxygen meter, Draeger colormetric tubes. The field log book or Attachment C shall be used to document onsite environmental monitoring.

C. Additional Safety Equipment: N/A

D. Health and Safety Work Procedures:

1. Site Briefings: Conduct a daily briefing with site personnel and go over work objectives and the major elements of this plan.
 - Tailgate Safety Meeting Form
 - In Field Notebook
2. Site Control: Control work areas using any combination of barricade tape, road cones, saw horses, etc. to prohibit the entry of unauthorized personnel; use buddy system.
3. Activity Specific Procedures:
 - (a) Task(s): Collect surface soil samples.

Procedures: Don protective equipment (e.g., Tyvek, gloves, boots, etc.); use good auger handling procedures; do not kneel in potentially contaminated areas; if any odors are noted, upgrade to Level C and conduct air monitoring.

Action Levels: 19.5%-O₂; 10% of LEL; PID-Bkgd = D+; PID-Bkgd to 5 ppm for 5 minutes = C; PID->5 ppm for 5 minutes or peak of 30 ppm or greater - stop operations; RAD->2 mR/hr = stop work; leave area.

3. (b) Task(s): Asphalt samples.

Procedures: Don protective equipment (e.g., Tyvek, gloves, boots, FFAPR); do not kneel in potentially contaminated areas; use good tool handling procedures; may need to use water mist during chipping to reduce dust.

Action Levels: In accordance with UXO subcontractor's H&S plan and SOPs.

3. (c) Task(s): N/A

Procedures: N/A

Action Levels: N/A

Other tasks (if applicable) are attached.

4. Personnel and Equipment Decontamination:

- Remove gross contamination from tools, respirator, monitoring equipment, boots, etc. prior to leaving the work-site, using water, paper towels, hand-wipes, etc.
- Either completely decontaminate soiled equipment at the work-site using detergent and water (if possible), or wrap equipment in plastic bag for transport until complete decontamination is possible.
- Always follow established personal decontamination procedures and remove contaminated gloves, Tyvek suits, used cartridges, paper towels, etc. by placing in a plastic bag and arrange for proper disposal.
- Wash hands and face thoroughly with soap and water before lunch or coffee breaks, and as soon as practicable after finishing work for the day.
- Additional Decontamination: Follow decontamination procedures in the program plan if more extensive decontamination is needed.

Emergency Procedures

Personal Injury. If authorized, administer appropriate first aid. The injured may need to be transported to the nearest hospital. If possible, notify hospital in advance of incoming patient and nature of injury. If there is a question about whether it is safe to move the victim, DO NOT move the victim - instead, make him/her as comfortable as possible, and summon emergency assistance.

Chemical Exposure. If site personnel show signs of inhalation exposure, retreat to fresh air for recovery. If symptoms warrant, bring the injured to the nearest hospital for observation, and discontinue work at that location and consult with H&S representative.

In case of skin or eye irritation due to chemical contact, wash affected skin with soap and water, or flush eyes with generous amount of water. If irritation is serious, seek medical attention.

Fire. If the fire can be easily contained and extinguished, do so with a portable fire extinguisher. If explosion risk is present, do not attempt to extinguish - evacuate all personnel to a safe area and call the fire department (796-2220).

Spills. If safe to do so, contain the spill if materials and equipment are available. If these materials are not available or the release is beyond the capabilities of site personnel, contact local emergency responders who are trained and equipped to control and cleanup the release (796-2220).

Important Note: If site observations, sampling results, or any other information indicates the presence of chemical contaminants other than those specified herein, this health and safety plan becomes void, and a new plan must be prepared and approved!

The field logbook or Attachment D shall be completed to document daily health and safety activities in the study areas.

Project Manager _____

Health & Safety Plan Prepared By _____ **Date** _____

Health & Safety Plan Approved By _____ **Date** _____

Arthur D. Little, Inc. PPE Checklist

- ☒ 1. MSA Ultratwin full-face air-purifying respirator, in a protective plastic bag
- ☒ 2. Nose cup insert for MSA Ultratwin respirator
- ☒ 3. Ear-muff set which fits into hardhat
- ☒ 4. Optional: Eyeglass kit for MSA Ultratwin respirator
- ☒ 5. MSA cartridges for respirator OV/AG/HEPA (GMC-H)
- ☒ 6. Protective lenses cover for MSA Ultratwin respirator
- ☒ 7. Disposable ear plugs
- ☒ 8. Silvershield gloves
- ☐ 9. Natural rubber gloves
- ☒ 10. Nitrile gloves
- ☐ 11. Polyethylene Tyvek suit
- ☐ 12. Saranex Tyvek suit
- ☒ 13. Safety glasses with side shields
- ☒ 14. Goggles
- ☒ 15. Plastic disposal bags
- ☒ 16. Hardhat
- ☒ 17. Duct tape
- ☒ 18. Other (list below)
- ☐ Standard Tyvek for hand augering and chipping activities.

Site-Specific Directions to Cutler Army Hospital

Site #33 DEH Entomology Shop (Bldg 262). Go south on Buena Vista to second stop sign (Dakota). Turn right on Dakota and take second left onto Queenstown Street. Hospital is on the left off Queenstown Street.

Site #34 Former DEH Entomology Shop at Bldg 245. Go south on Buena Vista to second stop sign (Dakota). Turn right on Dakota and take second left onto Queenstown Street. Hospital is on the left off Queenstown Street.

Site #35 Former DEH Entomology Shop at Bldg 254. Go south on Buena Vista to second stop sign (Dakota). Turn right on Dakota and take second left onto Queenstown Street. Hospital is on the left off Queenstown Street.

Site #36 Former DEH Entomology Shop at Bldg 272B. Go south on Buena Vista to second stop sign (Dakota). Turn right on Dakota and take second left onto Queenstown Street. Hospital is on the left off Queenstown Street.

Site #37 Golf Course Entomology Shop (Bldg 3622). Turn right onto Patton Road and first right onto Queenstown Street. Hospital is on the left.

Site #16 Shoppette Debris Disposal Area. Follow Patton Road until Queenstown Street appears on left. Take a left onto Queenstown Street. Hospital is to the left.

Site #17 Little Mirror Lake. (Follow Site #16, or) Follow Sheridan Road to Queenstown Street. Take a right onto Queenstown Street. Hospital is on the right.

Site #29 Transformer Storage Area. Follow Saratoga Street to Patton Road. Take a right onto Patton Road and a left onto Queenstown Street. Hospital is on the left.

Site #39 Transformer Near Bldg. 4250. Come back under Route 2. Take left onto Sheridan Road and a right onto Queenstown Street. Hospital is on the right.

Site #10 Construction Debris Area #1. Follow Perimeter Road until it intersects with Hospital Road. Turn left onto Hospital Road and then turn right on Givry Street. Take a right onto Jackson Road and turn left onto Patton Road. Bear right onto Sheridan Road and a right onto Queenstown Street. The hospital is on the left.

Site #11 Construction Debris Area #2. East on Lovell Street until it intersects with Hospital Road. Turn left onto Hospital Road and then turn right on Givry Street. Take a right onto Jackson Road and turn left onto Patton Road. Bear right onto Sheridan Road and a right onto Queenstown Street. The hospital is on the left.

Nashua River Study. Follow Perimeter Road until it intersects with Hospital Road. Turn left onto Hospital Road and then turn right on Givry Street. Take a right onto Jackson Road and turn left onto Patton Road. Bear right onto Sheridan Road and a right onto Queenstown Street. The hospital is on the left.

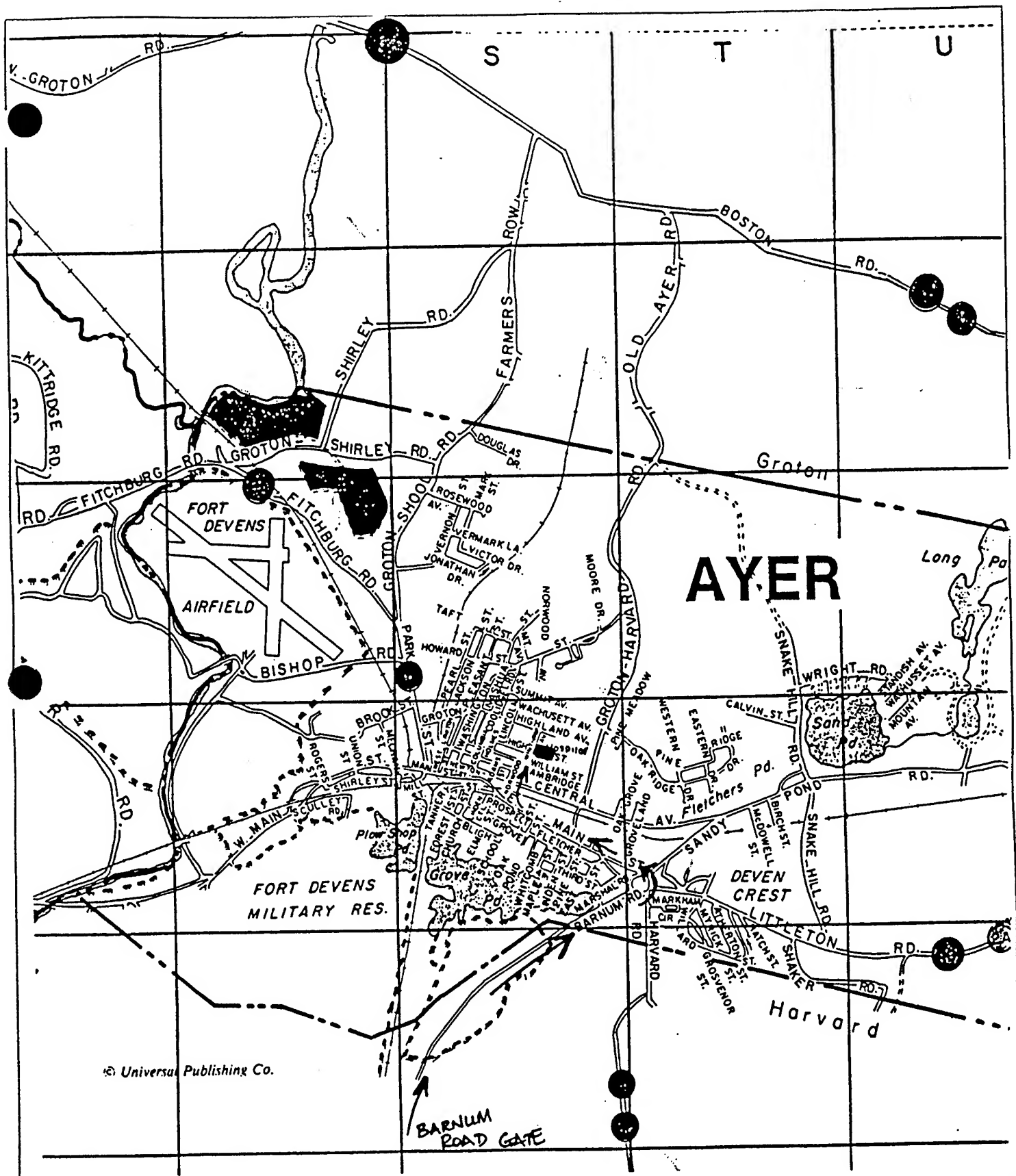


FIGURE 9-2
 ROUTES TO SECONDARY HOSPITAL
 FORT DEVENS, MASSACHUSETTS

**Site-Specific
Health and Safety Plan
Arthur D. Little, Inc.**

This plan is applicable for sites where the work involves unknown or uncharacterized chemical contamination. Please reference the Arthur D. Little Hazardous Waste Operation Health and Safety Program Plan for detail on the overall program. A copy of the most current Arthur D. Little Health and Safety Program Plan for Hazardous Waste Site Operations (April, 1992) and the Fort Devens Main Post Health and Safety Plan shall be available at the site in addition to other applicable documentation.

Job Name Fort Devens Site Investigation **Case No.** 67064

Site Location SA-39, Sylvania Building Site

Site History Information on this area is limited. This site reportedly used to have five underground storage tanks, three septic leach fields, and is known to have had an historic PCB transformer spill which was reportedly cleaned up.

Site Description/Nature of Work One test pit will be excavated, Geoprobe® borings will be advanced, three soil borings to a total depth of 20 feet and completed as monitoring wells will be advanced, and soil and ground water samples will be collected. Surface water and sediment samples will be collected from the nearby wetlands.

Dig Safe and Other Utilities Notified Site cleared during 1993 site investigation; no utilities present.

By Whom _____ **Date** _____

Response _____

File Numbers _____

Primary Level of Protection: Level D+

Contingency Level of Protection: Level C (if action levels are reached)

Emergency Phone Numbers

ADL Health and Safety Office: Primary 800-677-3000 x6106 (C. Briggs), Alternate x6112 (P. Roy), Alternate x5884 (S. Stricoff)

Ambulance: (508) 769-6911 **Fire:** (508) 796-2220 **Police:** (508) 796-3333

Hospital:Name Deaconess Nashoba HospitalAddress 200 Groton RoadHospital Phone Number (508) 772-0200Attach written directions and a map of the route to the nearest hospital
(Attachment 1)Other: Environmental/H&S - Jim Chambers Phone No. (508) 796-3114Location of Nearest Phone: Cellular phone in field vehicle**Site Hazards**

Chemical Hazards (overview, include source and location of contaminants):

PCBs, TPHC, and pesticides

Representative Chemicals	PEL/TLV/IDLH
<u>PCBs</u>	<u>0.5 mg/m³</u>
<u>TPHC</u>	<u>100 ppm</u>
<u>Malathion</u>	<u>10 mg/m³</u>
<u>DDT</u>	<u>1 mg/m³</u>
<u>TNT</u>	<u>1.5 mg/m³ (inh) 0.5 mg/m³ (dermal)</u>

Factors Indicating the Nature of the Potential or Known Contaminants at the Site:

Site History: ☒ Previous Sampling Results: _____ Current Use: _____

Explain: _____

Major Routes of Exposure: Primary - Dermal and inhalation; secondary - ingestion (if good hygiene not practiced), ocular (from potential dust generation), and injection (puncture wounds from sharp objects), blunt trauma (explosion)Symptoms of Exposure/Potential Health Effects: Dizziness, headache, nausea, euphoria, fatigue, unconsciousness, death (by chemical exposure and/or explosion of UXO)**Physical Hazards**

If drilling, the general types of hazards associated with a drill rig are present, namely, slips and falls, falling objects, hand, foot and back injuries, etc. If digging test pits, the additional hazards of a swinging backhole bucket, collapse of excavation, etc., exist.

Noise Hazards

The noise associated with operation of a drill rig or other heavy equipment can cause permanent, irreversible hearing loss. "Impact noise," such as that caused by driving a well point or split spoon with a drill rig hammer, is especially damaging. Proper hearing protection (ear muffs or plugs) must be worn when near a source of loud noise.

Fire Hazards: Not anticipated

Electrical Hazards: Overhead power lines and underground power lines

Oxygen Deficiency: Not anticipated

Confined Space Entry: ADL prohibited from this type of work

Radioactive Materials: Not anticipated

Other Hazards: Heat stress, cold stress, environmental hazards (e.g., ticks, insects, etc.).

Personnel Health and Safety Requirements

Medical Monitoring Requirements. Site personnel must be participants in ADL's, or similar, medical monitoring program, and must have had their most recent exam within the previous 12 months. The exam must have indicated no medical restrictions that would inhibit personnel from performing the required work tasks.

Training Requirements. All site personnel must have the current 40 hours or 8 hours (refresher) of relevant health and safety training and/or experience which included coverage of hazard recognition, use of site monitoring instruments, use of personal protective equipment, etc. Personnel must also be oriented to the components of this site-specific plan. Attachment A shall be utilized to document training and physical examination records of site personnel. Attachment B shall be used to document orientation to this site-specific plan.

Site Health and Safety Procedures

Procedures for a Site "Walk-Over":

Practice contamination avoidance at all times; do not step in areas of obvious contamination; do not move unlabelled or unknown containers; do not kneel on the ground, floor or other potentially contaminated surfaces; all efforts must be made to minimize contaminating clean work areas; wear proper personal protective equipment.

Procedures for Intrusive Site Work: (Drilling, Test Pits, etc.)

Intrusive work will be completed after UXO Clearance.

A. Personal Protective Equipment:

1. (a) PPE should be used on the site. (See the PPE Checklist attached to this plan; Attachment 2).
(b) Type of Respirator Cartridges: Organic vapor/acid gas/HEPA (GMC-H)
2. Additional Personal Protective Equipment: N/A

B. Monitoring Equipment: HNu or microtip; combustible gas/oxygen meter. The field log book or Attachment C shall be used to document onsite environmental monitoring.

C. Additional Safety Equipment: USCG-approved PFD with rubber chest waders shall be worn while collecting wetland samples. Lifelines may also be employed since samples will be collected 25 feet into the interior of the wetlands.

D. Health and Safety Work Procedures:

1. Site Briefings: Conduct a daily briefing with site personnel and go over work objectives and the major elements of this plan.
 - Tailgate Safety Meeting Form
 - In Field Notebook
2. Site Control: Control work area using any combination of barricade tape, road cones, saw horses, etc. to prohibit the entry of unauthorized personnel; use the buddy system.
3. Activity Specific Procedures:
 - (a) Task(s): Excavate test pit and collect soil samples

Procedures: Don protective equipment (hardhats a necessity); conduct all excavations in accordance with OSHA procedures; do not stand near the edge of the trench; do not enter the excavation; periodically monitor the area for airborne contamination; if odors are noted, upgrade to Level C and continue monitoring; cordon off the area with barricade tape, road cones, etc.; keep unauthorized personnel from the work area.

Action Levels: 19.5%-0₂; 10% of LEL; PID-bkgd=D; PID-bkgd-5 ppm for 5 min.=C; PID->5ppm for 5 minutes or peak of 30 ppm or greater, stop operations; RAD->2 mR/hr+stop work; leave area.

- (b) Task(s): Collect surface water and sediment samples

Procedures: Don protective equipment (e.g., PFD chest waders, gloves, goggles, etc.); use good sampling procedures; use extra care when walking in shallow (e.g., uneven surfaces, holes, etc.). Use buddy system at all times.

Action Levels: N/A

- (c) Task(s): UXO clearance by UXO subcontractor.

Procedures: All work in accordance with UXO subcontractor's H&S plan and SOPs.

Action Levels: All work In accordance with UXO subcontractor's H&S plan and SOPs.

- (d) Task(s): Collect subsurface soil samples.

Procedures: Don protective equipment (e.g., gloves, eye protection, etc.); use good drilling and sampling procedures; practice contamination avoidance; periodically monitor the bore hole; if odors are noted, upgrade to Level C and continue to monitor.

Action Levels: 19.5%-O₂; 10% of LEL; PID-bkgd=D; PID-bkgd-5 ppm for 5 min.=C; PID->5ppm for 5 minutes or peak of 30 ppm or greater, stop operations; RAD->2 mR/hr+stop work; leave area.

- (e) Task(s): Collect ground water samples

Procedures: Don protective equipment (e.g., gloves, eye protection, etc.); use good sampling procedures; practice contamination avoidance; periodically monitor the monitoring well and breathing zone; if odors are noted, upgrade to Level C and continue to monitor.

Action Levels: 19.5%-O₂; 10% of LEL; PID-bkgd=D; PID-bkgd-5 ppm for 5 min.=C; PID->5ppm for 5 minutes or peak of 30 ppm or greater, stop operations; RAD->2 mR/hr+stop work; leave area.

- (f) Task(s): Geoprobe® sampling

Procedures: Don protective equipment (e.g., gloves, eye protection, etc.); use good sampling procedures; practice contamination avoidance; periodically monitor the monitoring well and breathing zone; if odors are noted, upgrade to Level C and continue to monitor.

Action Levels: 19.5%-O₂; 10% of LEL; PID-bkgd=D; PID-bkgd-5 ppm for 5 min.=C; PID->5ppm for 5 minutes or peak of 30 ppm or greater, stop operations; RAD->2 mR/hr+stop work; leave area.

4. Personnel and Equipment Decontamination:

- Remove gross contamination from tools, respirator, monitoring equipment, boots, etc. prior to leaving the work-site, using water, paper towels, hand-wipes, etc.
- Either completely decontaminate soiled equipment at the work-site using detergent and water (if possible), or wrap equipment in plastic bag for transport until complete decontamination is possible.
- Always follow established personal decontamination procedures and remove contaminated gloves, Tyvek suits, used cartridges, paper towels, etc. by placing in a plastic bag and arrange for proper disposal.
- Wash hands and face thoroughly with soap and water before lunch or coffee breaks, and as soon as practicable after finishing work for the day.
- Additional Decontamination: Follow decontamination procedures in the program plan if more extensive decontamination is needed.

Emergency Procedures

Personal Injury. If authorized, administer appropriate first aid. The injured may need to be transported to the nearest hospital. If possible, notify hospital in advance of incoming patient and nature of injury. If there is a question about whether it is safe to move the victim, DO NOT move the victim - instead, make him/her as comfortable as possible, and summon emergency assistance.

Chemical Exposure. If site personnel show signs of inhalation exposure, retreat to fresh air for recovery. If symptoms warrant, bring the injured to the nearest hospital for observation, and discontinue work at that location and consult with H&S representative.

In case of skin or eye irritation due to chemical contact, wash affected skin with soap and water, or flush eyes with generous amount of water. If irritation is serious, seek medical attention.

Fire. If the fire can be easily contained and extinguished, do so with a portable fire extinguisher. If explosion risk is present, do not attempt to extinguish - evacuate all personnel to a safe area and call the fire department (508-796-2220).

Spills. If safe to do so, contain the spill if materials and equipment are available. If these materials are not available or the release is beyond the capabilities of site personnel, contact local emergency responders who are trained and equipped to control and cleanup the release (508-796-2220).

Important Note: If site observations, sampling results, or any other information indicates the presence of chemical contaminants other than those specified herein, this health and safety plan becomes void, and a new plan must be prepared and approved!

The field logbook or Attachment D shall be completed to document daily health and safety activities in the study areas.

Project Manager Mark O'Hara 8/4/94

Health & Safety Plan Prepared By Marys Greenwood Date 8/4/94

Health & Safety Plan Approved By Cory Buje Date 8/8/94

Arthur D. Little, Inc. PPE Checklist

- ☒ 1. MSA Ultratwin full-face air-purifying respirator, in a protective plastic bag
- ☒ 2. Nose cup insert for MSA Ultratwin respirator
- ☒ 3. Ear-muff set which fits into hardhat
- ☒ 4. Optional: Eyeglass kit for MSA Ultratwin respirator
- ☒ 5. MSA cartridges for respirator OV/AG/HEPA (GMC-H)
- ☒ 6. Protective lenses cover for MSA Ultratwin respirator
- ☒ 7. Disposable ear plugs
- ☒ 8. Silvershield gloves
- ☐ 9. Natural rubber gloves
- ☒ 10. Nitrile gloves
- ☒ 11. Polyethylene Tyvek suit
- ☒ 12. Saranex Tyvek suit (if visible oil/PCB seen)
- ☒ 13. Safety glasses with side shields
- ☐ 14. Goggles
- ☒ 15. Plastic disposal bags
- ☒ 16. Hardhat
- ☒ 17. Duct tape
- ☐ 18. Other (list below)

Site-Specific Directions to Cutler Army Hospital

Site #33 DEH Entomology Shop (Bldg 262). Go south on Buena Vista to second stop sign (Dakota). Turn right on Dakota and take second left onto Queenstown Street. Hospital is on the left off Queenstown Street.

Site #34 Former DEH Entomology Shop at Bldg 245. Go south on Buena Vista to second stop sign (Dakota). Turn right on Dakota and take second left onto Queenstown Street. Hospital is on the left off Queenstown Street.

Site #35 Former DEH Entomology Shop at Bldg 254. Go south on Buena Vista to second stop sign (Dakota). Turn right on Dakota and take second left onto Queenstown Street. Hospital is on the left off Queenstown Street.

Site #36 Former DEH Entomology Shop at Bldg 272B. Go south on Buena Vista to second stop sign (Dakota). Turn right on Dakota and take second left onto Queenstown Street. Hospital is on the left off Queenstown Street.

Site #37 Golf Course Entomology Shop (Bldg 3622). Turn right onto Patton Road and first right onto Queenstown Street. Hospital is on the left.

Site #16 Shoppette Debris Disposal Area. Follow Patton Road until Queenstown Street appears on left. Take a left onto Queenstown Street. Hospital is to the left.

Site #17 Little Mirror Lake. (Follow Site #16, or) Follow Sheridan Road to Queenstown Street. Take a right onto Queenstown Street. Hospital is on the right.

Site #29 Transformer Storage Area. Follow Saratoga Street to Patton Road. Take a right onto Patton Road and a left onto Queenstown Street. Hospital is on the left.

Site #39 Transformer Near Bldg. 4250. Come back under Route 2. Take left onto Sheriden Road and a right onto Queenstown Street. Hospital is on the right.

Site #10 Construction Debris Area #1. Follow Perimeter Road until it intersects with Hospital Road. Turn left onto Hospital Road and then turn right on Givry Street. Take a right onto Jackson Road and turn left onto Patton Road. Bear right onto Sheridan Road and a right onto Queenstown Street. The hospital is on the left.

Site #11 Construction Debris Area #2. East on Lovell Street until it intersects with Hospital Road. Turn left onto Hospital Road and then turn right on Givry Street. Take a right onto Jackson Road and turn left onto Patton Road. Bear right onto Sheridan Road and a right onto Queenstown Street. The hospital is on the left.

Nashua River Study. Follow Perimeter Road until it intersects with Hospital Road. Turn left onto Hospital Road and then turn right on Givry Street. Take a right onto Jackson Road and turn left onto Patton Road. Bear right onto Sheridan Road and a right onto Queenstown Street. The hospital is on the left.



FIGURE 9-1
ROUTES TO PRIMARY HOSPITAL
FORT DEVENS, MASSACHUSETTS

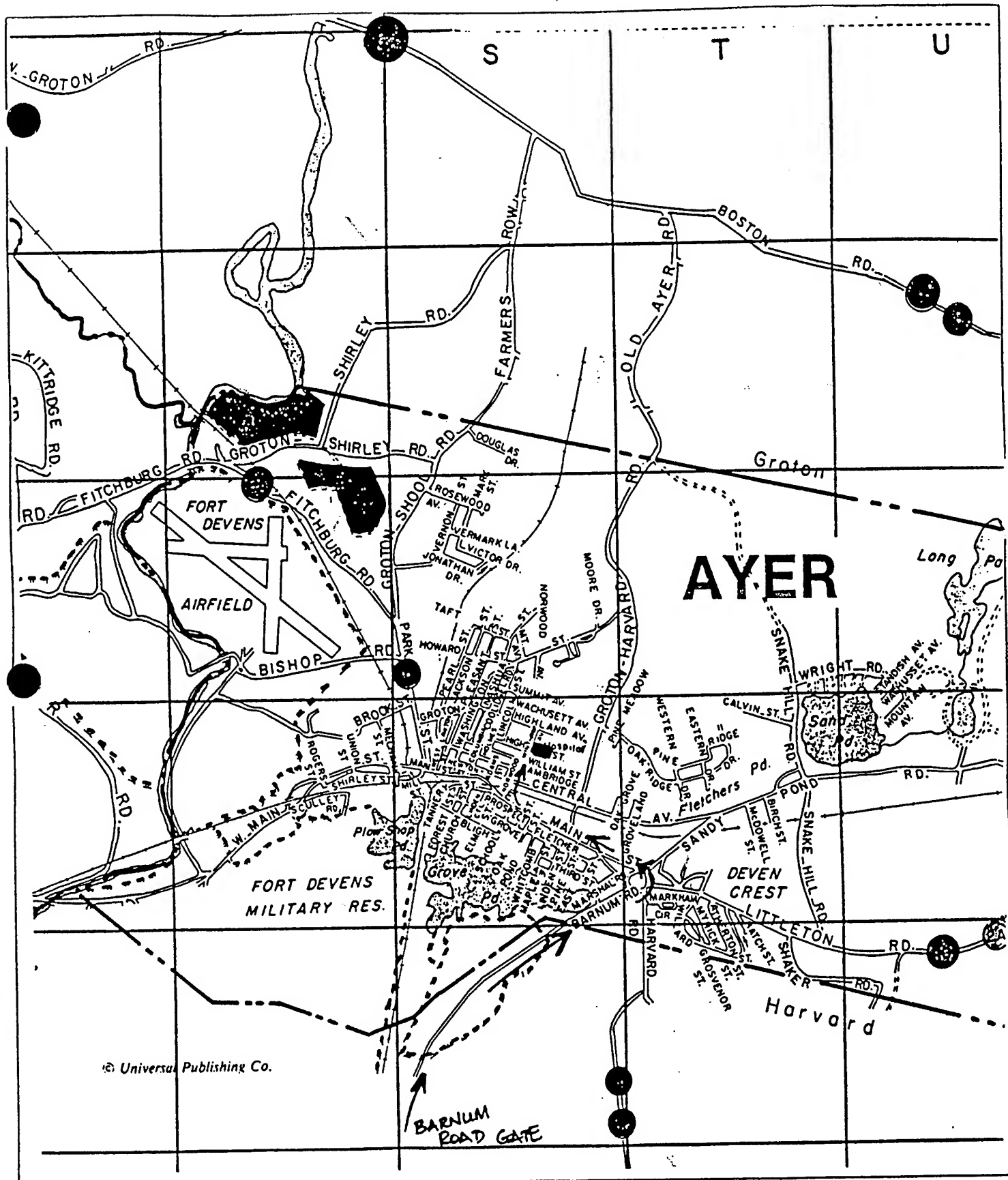


FIGURE 9-2
 ROUTES TO SECONDARY HOSPITAL
 FORT DEVENS, MASSACHUSETTS

**Site-Specific
Health and Safety Plan
Arthur D. Little, Inc.**

This plan is applicable for sites where the work involves unknown or uncharacterized chemical contamination. Please reference the Arthur D. Little Hazardous Waste Operation Health and Safety Program Plan for detail on the overall program. A copy of the most current Arthur D. Little Health and Safety Program Plan for Hazardous Waste Site Operations (April, 1992) and the Fort Devens Main Post Health and Safety Plan shall be available at the site in addition to other applicable documentation.

Job Name Fort Devens Site Investigation **Case No.** 67064

Site Location SA10, Construction Debris Area #1

Site History This Construction Debris Area encompasses an approximately 80 acre parcel of land located near the northwest corner of the Main Post. This site is the former location of the base hospital and the presence of former foundations and associated demolition debris may still remain within the subsurface.

Site Description/Nature of Work The scope of work for this area includes: records review; conducting a geophysical survey over approximately 10 acres of the site to define the presence and extent of potential debris areas identified during the records review; excavate test pits with one soil sample per pit to visually and chemically confirm the presence or absence of debris; and collect a composite debris sample for solid waste characterization.

Conduct geophysics survey and inspect the area for visible contamination; excavate test pits and collect soil samples.

A site plan is provided in the Work Plan for the Fort Devens Main Post SI.

Dig Safe and Other Utilities Notified _____

By Whom _____ **Date** _____

Response _____

File Numbers _____

Primary Level of Protection: Level D+

Contingency Level of Protection: Level C (if dusting and odors are noted and/or action levels are reached).

Emergency Phone Numbers

ADL Health and Safety Office: Primary 800-677-3000 x6106 (C. Briggs), Alternate 800-677-3000 x6112 (P. Roy), Alternate 800-677-3000 x5884 (S. Stricoff)

Ambulance: 769-6911 **Fire:** 796-2220 **Police:** 796-3333

Hospital:

Name Culter Army Hospital

Address Building 3654 - Fort Devens

Hospital Phone Number 796-6911

Attach written directions and a map of the route to the nearest hospital (Attachment 1)

Other: Nashoba Community Hospital **Phone No.** 772-2657

Environmental/H&S - Bill Mullen **Phone No.** 796-3114

Location of Nearest Phone: _____

Site Hazards

Chemical Hazards (overview, include source and location of contaminants):

Asbestos insulation may have been deposited here in the past; other debris may be encountered.

Representative Chemicals

PEL/TLV/IDLH

Asbestos (Various) 0.2 - 2 fibers/CC

Factors Indicating the Nature of the Potential or Known Contaminants at the Site:

Site History: ✓ **Previous Sampling Results:** _____ **Current Use:** _____

Explain: _____

Major Routes of Exposure: Dermal and inhalation primarily; ingestion if good hygiene not practiced; potential injection from cuts caused by sharp objects.

Symptoms of Exposure/Potential Health Effects: See Attachment E.

Note: Pesticides and herbicides have characteristic odors but cannot be easily monitored with direct reading instruments. Upgrade a Level of Protection when in doubt.

Physical Hazards

If drilling, the general types of hazards associated with a drill rig are present, namely, slips and falls, falling objects, hand, foot and back injuries, etc. If digging test pits, the additional hazards of a swinging backhole bucket, collapse of excavation, etc., exist.

Noise Hazards

The noise associated with operation of a drill rig or other heavy equipment can cause permanent, irreversible hearing loss. "Impact noise," such as that caused by driving a well point or split spoon with a drill rig hammer, is especially damaging. Proper hearing protection (ear muffs or plugs) must be worn when near a source of loud noise.

Fire Hazards: Fuel tank of excavation equipment; underground fuel/gas lines or tanks; hitting buried containers; possible methane generation.

Electrical Hazards: Live electrical circuits in building, overhead lines, potential exposed circuit boxes and wires; underground lines.

Oxygen Deficiency: Could result from degradation of buried debris (also methane generation).

Confined Space Entry: Entry into trenches is prohibited.

Radioactive Materials: Not anticipated but a general screening to be conducted.

Other Hazards: Heat stress, cold stress, environmental hazards (e.g., ticks, insects, etc.).

Personnel Health and Safety Requirements

Medical Monitoring Requirements. Site personnel must be participants in ADL's, or similar, medical monitoring program, and must have had their most recent exam within the previous 12 months. The exam must have indicated no medical restrictions that would inhibit personnel from performing the required work tasks.

Training Requirements. All site personnel must have the current 40 hours or 8 hours (refresher) of relevant health and safety training and/or experience which included coverage of hazard recognition, use of site monitoring instruments, use of personal protective equipment, etc. Personnel must also be oriented to the components of this site-specific plan. Attachment A shall be utilized to document training and physical examination records of site personnel. Attachment B shall be used to document orientation to this site-specific plan.

Site Health and Safety Procedures

Procedures for a Site "Walk-Over":

Practice contamination avoidance at all times; do not step in areas of obvious contamination; do not move unlabelled or unknown containers; do not kneel on ground, floor or other potentially contaminated surfaces; all efforts must be made to minimize contaminating clean work areas; wear proper personal protective equipment.

Procedures for Intrusive Site Work: (Drilling, Test Pits, etc.)

A. Personal Protective Equipment:

1. (a) PPE should be used on the site. (See the PPE Checklist attached to this plan; Attachment 2).

(b) Type of Respirator Cartridges: OV/AG/HEPA

2. Additional Personal Protective Equipment:

Silvershield Inner Gloves

Nitrite outer gloves

Safety glasses w/side shields

Hard Hats

Steel toe-steel shank chemically resistant boots

- B. Monitoring Equipment:** HNu or Microtip; combustible gas/oxygen meter, Draeger colormetric tubes. The field log book or Attached C shall be used to document onsite environmental monitoring.

C. Additional Safety Equipment: _____

D. Health and Safety Work Procedures:

1. Site Briefings: Conduct a daily briefing with site personnel and go over work objectives and the major elements of this plan.
 - Tailgate Safety Meeting Form
 - In Field Notebook
2. Site Control: Control work areas using any combination of barricade tape, road cones, saw horses, etc. to prohibit the entry of unauthorized personnel; use buddy system.

3. Activity Specific Procedures:

(a) Task(s): Geophysics survey and site inspection.

Procedures: Don protective equipment (e.g., hard hats, standard Tyvek safety glasses, gloves, boots); practice contamination avoidance; watch for uneven walking surfaces.

Action Levels: N/A

3. (b) Task(s): Excavate ten test pits and collect ten soil samples.

Procedures: Don protective equipment (especially hardhats); conduct all excavations in accordance with OSHA procedures; do not stand near the edge of the trench; do not enter the excavation; periodically monitor the area for airborne contamination; if odors are noted, upgrade to Level C and continue monitoring; cordon off the area with barricade tape, road cones, etc.; keep unauthorized personnel from the work area.

Action Levels: 19.5%-O₂; 10% of LEL; PID-Bkgd = D+; PID-Bkgd to 5 ppm for 5 minutes = C; PID->5 ppm for 5 minutes or peak of 30 ppm or greater-stop operations; RAD->2 mR/hr = stop work; leave area.

3. (c) Task(s): N/A

Procedures: N/A

Action Levels: N/A

Other tasks (if applicable) are attached.

4. Personnel and Equipment Decontamination:

- Remove gross contamination from tools, respirator, monitoring equipment, boots, etc. prior to leaving the work-site, using water, paper towels, hand-wipes, etc.
- Either completely decontaminate soiled equipment at the work-site using detergent and water (if possible), or wrap equipment in plastic bag for transport until complete decontamination is possible.
- Always follow established personal decontamination procedures and remove contaminated gloves, Tyvek suits, used cartridges, paper towels, etc. by placing in a plastic bag and arrange for proper disposal.
- Wash hands and face thoroughly with soap and water before lunch or coffee breaks, and as soon as practicable after finishing work for the day.
- Additional Decontamination: Follow decontamination procedures in the program plan if more extensive decontamination is needed.

Emergency Procedures

Personal Injury. If authorized, administer appropriate first aid. The injured may need to be transported to the nearest hospital. If possible, notify hospital in advance of incoming patient and nature of injury. If there is a question about whether it is safe to move the victim, DO NOT move the victim - instead, make him/her as comfortable as possible, and summon emergency assistance.

Chemical Exposure. If site personnel show signs of inhalation exposure, retreat to fresh air for recovery. If symptoms warrant, bring the injured to the nearest hospital for observation, and discontinue work at that location and consult with H&S representative.

In case of skin or eye irritation due to chemical contact, wash affected skin with soap and water, or flush eyes with generous amount of water. If irritation is serious, seek medical attention.

Fire. If the fire can be easily contained and extinguished, do so with a portable fire extinguisher. If explosion risk is present, do not attempt to extinguish - evacuate all personnel to a safe area and call the fire department (796-2220).

Spills. If safe to do so, contain the spill if materials and equipment are available. If these materials are not available or the release is beyond the capabilities of site personnel, contact local emergency responders who are trained and equipped to control and cleanup the release (796-2220).

Important Note: If site observations, sampling results, or any other information indicates the presence of chemical contaminants other than those specified herein, this health and safety plan becomes void, and a new plan must be prepared and approved!

The field logbook or Attachment D shall be completed to document daily health and safety activities in the study areas.

Project Manager _____

Health & Safety Plan Prepared By _____ **Date** _____

Health & Safety Plan Approved By _____ **Date** _____

Arthur D. Little, Inc. PPE Checklist

- ☒ 1. MSA Ultratwin full-face air-purifying respirator, in a protective plastic bag
 - ☒ 2. Nose cup insert for MSA Ultratwin respirator
 - ☒ 3. Ear-muff set which fits into hardhat
 - ☒ 4. Optional: Eyeglass kit for MSA Ultratwin respirator
 - ☒ 5. MSA cartridges for respirator OV/AG/HEPA (GMC-H)
 - ☒ 6. Protective lenses cover for MSA Ultratwin respirator
 - ☒ 7. Disposable ear plugs
 - ☒ 8. Silvershield gloves
 - ☐ 9. Natural rubber gloves
 - ☒ 10. Nitrile gloves
 - ☒ 11. Polyethylene Tyvek suit
 - ☒ 12. Saranex Tyvek suit
 - ☒ 13. Safety glasses with side shields
 - ☒ 14. Goggles
 - ☒ 15. Plastic disposal bags
 - ☒ 16. Hardhat
 - ☒ 17. Duct tape
 - ☒ 18. Other (list below)
- Standard Tyvek for geophysics survey.
 - Standard Tyvek for sampling test pits.

Site-Specific Directions to Cutler Army Hospital

Site #33 DEH Entomology Shop (Bldg 262). Go south on Buena Vista to second stop sign (Dakota). Turn right on Dakota and take second left onto Queenstown Street. Hospital is on the left off Queenstown Street.

Site #34 Former DEH Entomology Shop at Bldg 245. Go south on Buena Vista to second stop sign (Dakota). Turn right on Dakota and take second left onto Queenstown Street. Hospital is on the left off Queenstown Street.

Site #35 Former DEH Entomology Shop at Bldg 254. Go south on Buena Vista to second stop sign (Dakota). Turn right on Dakota and take second left onto Queenstown Street. Hospital is on the left off Queenstown Street.

Site #36 Former DEH Entomology Shop at Bldg 272B. Go south on Buena Vista to second stop sign (Dakota). Turn right on Dakota and take second left onto Queenstown Street. Hospital is on the left off Queenstown Street.

Site #37 Golf Course Entomology Shop (Bldg 3622). Turn right onto Patton Road and first right onto Queenstown Street. Hospital is on the left.

Site #16 Shoppette Debris Disposal Area. Follow Patton Road until Queenstown Street appears on left. Take a left onto Queenstown Street. Hospital is to the left.

Site #17 Little Mirror Lake. (Follow Site #16, or) Follow Sheridan Road to Queenstown Street. Take a right onto Queenstown Street. Hospital is on the right.

Site #29 Transformer Storage Area. Follow Saratoga Street to Patton Road. Take a right onto Patton Road and a left onto Queenstown Street. Hospital is on the left.

Site #39 Transformer Near Bldg. 4250. Come back under Route 2. Take left onto Sheridan Road and a right onto Queenstown Street. Hospital is on the right.

Site #10 Construction Debris Area #1. Follow Perimeter Road until it intersects with Hospital Road. Turn left onto Hospital Road and then turn right on Givry Street. Take a right onto Jackson Road and turn left onto Patton Road. Bear right onto Sheridan Road and a right onto Queenstown Street. The hospital is on the left.

Site #11 Construction Debris Area #2. East on Lovell Street until it intersects with Hospital Road. Turn left onto Hospital Road and then turn right on Givry Street. Take a right onto Jackson Road and turn left onto Patton Road. Bear right onto Sheridan Road and a right onto Queenstown Street. The hospital is on the left.

Nashua River Study. Follow Perimeter Road until it intersects with Hospital Road. Turn left onto Hospital Road and then turn right on Givry Street. Take a right onto Jackson Road and turn left onto Patton Road. Bear right onto Sheridan Road and a right onto Queenstown Street. The hospital is on the left.

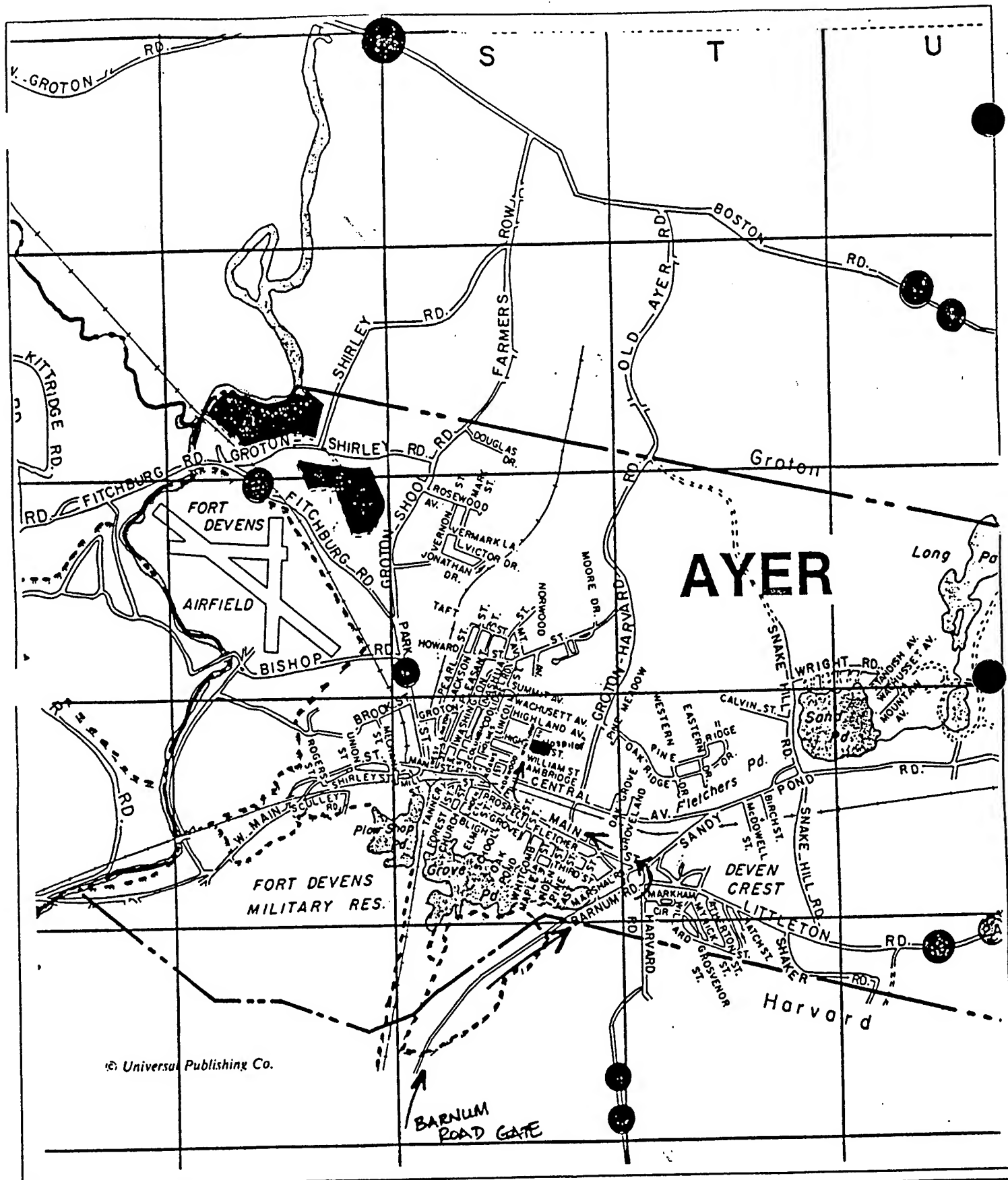


FIGURE 1
ROUTES TO SECONDARY HOSPITAL
FORT DEVENS, MASSACHUSETTS

**Site-Specific
Health and Safety Plan
Arthur D. Little, Inc.**

This plan is applicable for sites where the work involves unknown or uncharacterized chemical contamination. Please reference the Arthur D. Little Hazardous Waste Operation Health and Safety Program Plan for detail on the overall program. A copy of the most current Arthur D. Little Health and Safety Program Plan for Hazardous Waste Site Operations (April, 1992) and the Fort Devens Main Post SI shall be available at the site in addition to other applicable documentation.

Job Name Fort Devens Site Investigation **Case No.** 67064

Site Location SA11, Construction Debris Area #2

Site History This Construction Debris Area is characterized by an upper (north) and lower (south) area located along the western bank of the Nashua River. This site is reported to be the disposal site for a majority of the former hospital demolition debris. Debris is apparent throughout the southern portion of the site.

Site Description/Nature of Work The scope of work for this area includes: records review; conducting a geophysical survey over the northern portion of the site to define the presence and extent of potential debris areas; excavate test pits with one soil sample per pit within the northern portion of the site and test pits with one soil sample per pit within the southern portion of the site to visually and chemically confirm the presence or absence of debris; and collect a composite debris sample from both the north and south sites for solid waste characterization.

Conduct geophysics surveys and site inspections; excavate four test pits and collect soil samples.

A site plan is provided in the Work Plan for the Fort Devens Main Post SI.

Dig Safe and Other Utilities Notified _____

By Whom _____ **Date** _____

Response _____

File Numbers _____

Primary Level of Protection: Level D+

Contingency Level of Protection: Level C (if dusting and odors are noted and/or action levels are reached).

Emergency Phone Numbers

ADL Health and Safety Office: Primary 800-677-3000 x6106 (C. Briggs), Alternate 800-677-3000 x6112 (P. Roy), Alternate 800-677-3000 x5884 (S. Stricoff)

Ambulance: 769-6911 **Fire:** 796-2220 **Police:** 796-3333

Hospital:

Name Culter Army Hospital

Address Building 3654 - Fort Devens

Hospital Phone Number 796-6911

Attach written directions and a map of the route to the nearest hospital (Attachment 1)

Other: Nashoba Community Hospital **Phone No.** 772-2657

Environmental/H&S - Bill Mullen **Phone No.** 796-3114

Location of Nearest Phone: _____

Site Hazards

Chemical Hazards (overview, include source and location of contaminants):

Asbestos insulation may have been deposited here.

Representative Chemicals

PEL/TLV/IDLH

Asbestos (Various) 0.2 - 2 fibers/CC

Factors Indicating the Nature of the Potential or Known Contaminants at the Site:

Site History: ✓ **Previous Sampling Results:** _____ **Current Use:** _____

Explain: _____

Major Routes of Exposure: Dermal and inhalation primarily; ingestion possible if good hygiene not practiced; potential injection from cuts caused by sharp objects.

Symptoms of Exposure/Potential Health Effects: See Attachment E.

Note: Pesticides and herbicides have characteristic odors but cannot be easily monitored with direct reading instruments. Upgrade a Level of Protection when in doubt.

Physical Hazards

If drilling, the general types of hazards associated with a drill rig are present, namely, slips and falls, falling objects, hand, foot and back injuries, etc. If digging test pits, the additional hazards of a swinging backhole bucket, collapse of excavation, etc., exist.

Noise Hazards

The noise associated with operation of a drill rig or other heavy equipment can cause permanent, irreversible hearing loss. "Impact noise," such as that caused by driving a well point or split spoon with a drill rig hammer, is especially damaging. Proper hearing protection (ear muffs or plugs) must be worn when near a source of loud noise.

Fire Hazards: Fuel tank of excavation equipment; underground fuel/gas lines or tanks; hitting buried containers; possible methane generation.

Electrical Hazards: Live electrical circuits in building, overhead lines, potential exposed circuit boxes and wires; underground lines.

Oxygen Deficiency: Could result from degradation of buried debris (also methane generation).

Confined Space Entry: Entry into trenches is prohibited.

Radioactive Materials: Not anticipated but a general screening to be conducted.

Other Hazards: Heat stress, cold stress, environmental hazards (e.g., ticks, insects, etc.).

Personnel Health and Safety Requirements

Medical Monitoring Requirements. Site personnel must be participants in ADL's, or similar, medical monitoring program, and must have had their most recent exam within the previous 12 months. The exam must have indicated no medical restrictions that would inhibit personnel from performing the required work tasks.

Training Requirements. All site personnel must have the current 40 hours or 8 hours (refresher) of relevant health and safety training and/or experience which included coverage of hazard recognition, use of site monitoring instruments, use of personal protective equipment, etc. Personnel must also be oriented to the components of this site-specific plan. Attachment A shall be utilized to document training and physical examination records of site personnel. Attachment B shall be used to document orientation to this site-specific plan.

Site Health and Safety Procedures

Procedures for a Site "Walk-Over":

Practice contamination avoidance at all times; do not step in areas of obvious contamination; do not move unlabelled or unknown containers; do not kneel on ground, floor or other potentially contaminated surfaces; all efforts must be made to minimize contaminating clean work areas; wear proper personal protective equipment.

Procedures for Intrusive Site Work: (Drilling, Test Pits, etc.)

A. Personal Protective Equipment:

1. (a) PPE should be used on the site. (See the PPE Checklist attached to this plan; Attachment 2).

(b) Type of Respirator Cartridges: OV/AG/HEPA

2. Additional Personal Protective Equipment:

B. Monitoring Equipment: HNu or Microtip; combustible gas/oxygen meter, Draeger colormetric tubes. The field log book or Attached C shall be used to document onsite environmental monitoring.

C. Additional Safety Equipment: _____

D. Health and Safety Work Procedures:

1. Site Briefings: Conduct a daily briefing with site personnel and go over work objectives and the major elements of this plan.

- Tailgate Safety Meeting Form
- In Field Notebook

2. Site Control: Control work areas using any combination of barricade tape, road cones, saw horses, etc. to prohibit the entry of unauthorized personnel; use buddy system.

3. Activity Specific Procedures:

(a) Task(s): Geophysics survey and site inspection.

Procedures: Don protective equipment (e.g., hard hats, standard Tyvek safety glasses, gloves, boots); practice contamination avoidance; watch for uneven walking surfaces.

Action Levels: N/A

3. (b) Task(s): Excavate test pits and collect four soil samples.

Procedures: Don protective equipment (especially hardhats); conduct all excavations in accordance with OSHA procedures; do not stand near the edge of the trench; do not enter the excavation; periodically monitor the area for airborne contamination; if odors are noted, upgrade to Level C and continue monitoring; cordon off the area with barricade tape, road cones, etc.; keep unauthorized personnel from the work area.

Action Levels: 19.5%-O₂; 10% of LEL; PID-Bkgd = D+; PID-Bkgd to 5 ppm for 5 minutes = C; PID->5 ppm for 5 minutes or peak of 30 ppm or greater-stop operations; RAD->2 mR/hr = stop work; leave area

3. (c) Task(s): N/A

Procedures: N/A

Action Levels: N/A

Other tasks (if applicable) are attached.

4. Personnel and Equipment Decontamination:

- Remove gross contamination from tools, respirator, monitoring equipment, boots, etc. prior to leaving the work-site, using water, paper towels, hand-wipes, etc.
- Either completely decontaminate soiled equipment at the work-site using detergent and water (if possible), or wrap equipment in plastic bag for transport until complete decontamination is possible.
- Always follow established personal decontamination procedures and remove contaminated gloves, Tyvek suits, used cartridges, paper towels, etc. by placing in a plastic bag and arrange for proper disposal.
- Wash hands and face thoroughly with soap and water before lunch or coffee breaks, and as soon as practicable after finishing work for the day.
- Additional Decontamination: Follow decontamination procedures in the program plan if more extensive decontamination is needed.

Emergency Procedures

Personal Injury. If authorized, administer appropriate first aid. The injured may need to be transported to the nearest hospital. If possible, notify hospital in advance of incoming patient and nature of injury. If there is a question about whether it is safe to move the victim, DO NOT move the victim - instead, make him/her as comfortable as possible, and summon emergency assistance.

Chemical Exposure. If site personnel show signs of inhalation exposure, retreat to fresh air for recovery. If symptoms warrant, bring the injured to the nearest hospital for observation, and discontinue work at that location and consult with H&S representative.

In case of skin or eye irritation due to chemical contact, wash affected skin with soap and water, or flush eyes with generous amount of water. If irritation is serious, seek medical attention.

Fire. If the fire can be easily contained and extinguished, do so with a portable fire extinguisher. If explosion risk is present, do not attempt to extinguish - evacuate all personnel to a safe area and call the fire department (796-2220).

Spills. If safe to do so, contain the spill if materials and equipment are available. If these materials are not available or the release is beyond the capabilities of site personnel, contact local emergency responders who are trained and equipped to control and cleanup the release (796-2220).

Important Note: If site observations, sampling results, or any other information indicates the presence of chemical contaminants other than those specified herein, this health and safety plan becomes void, and a new plan must be prepared and approved!

The field logbook or Attachment D shall be completed to document daily health and safety activities in the study areas.

Project Manager _____

Health & Safety Plan Prepared By _____ **Date** _____

Health & Safety Plan Approved By _____ **Date** _____

Arthur D. Little, Inc. PPE Checklist

- ✓ ☐ 1. MSA Ultratwin full-face air-purifying respirator, in a protective plastic bag
- ✓ ☐ 2. Nose cup insert for MSA Ultratwin respirator
- ✓ ☐ 3. Ear-muff set which fits into hardhat
- ✓ ☐ 4. Optional: Eyeglass kit for MSA Ultratwin respirator
- ✓ ☐ 5. MSA cartridges for respirator OV/AG/HEPA (GMC-H)
- ✓ ☐ 6. Protective lenses cover for MSA Ultratwin respirator
- ✓ ☐ 7. Disposable ear plugs
- ✓ ☐ 8. Silvershield gloves
- ☐ 9. Natural rubber gloves
- ✓ ☐ 10. Nitrile gloves
- ✓ ☐ 11. Polyethylene Tyvek suit
- ✓ ☐ 12. Saranex Tyvek suit
- ✓ ☐ 13. Safety glasses with side shields
- ✓ ☐ 14. Goggles
- ✓ ☐ 15. Plastic disposal bags
- ✓ ☐ 16. Hardhat
- ✓ ☐ 17. Duct tape
- ✓ ☐ 18. Other (list below)
 - Standard Tyvek for geophysics survey.
 - Standard Tyvek for sampling test pits.
 - Possible upgrade to coated Tyvek if needed.

Site-Specific Directions to Cutler Army Hospital

Site #33 DEH Entomology Shop (Bldg 262). Go south on Buena Vista to second stop sign (Dakota). Turn right on Dakota and take second left onto Queenstown Street. Hospital is on the left off Queenstown Street.

Site #34 Former DEH Entomology Shop at Bldg 245. Go south on Buena Vista to second stop sign (Dakota). Turn right on Dakota and take second left onto Queenstown Street. Hospital is on the left off Queenstown Street.

Site #35 Former DEH Entomology Shop at Bldg 254. Go south on Buena Vista to second stop sign (Dakota). Turn right on Dakota and take second left onto Queenstown Street. Hospital is on the left off Queenstown Street.

Site #36 Former DEH Entomology Shop at Bldg 272B. Go south on Buena Vista to second stop sign (Dakota). Turn right on Dakota and take second left onto Queenstown Street. Hospital is on the left off Queenstown Street.

Site #37 Golf Course Entomology Shop (Bldg 3622). Turn right onto Patton Road and first right onto Queenstown Street. Hospital is on the left.

Site #16 Shoppette Debris Disposal Area. Follow Patton Road until Queenstown Street appears on left. Take a left onto Queenstown Street. Hospital is to the left.

Site #17 Little Mirror Lake. (Follow Site #16, or) Follow Sheridan Road to Queenstown Street. Take a right onto Queenstown Street. Hospital is on the right.

Site #29 Transformer Storage Area. Follow Saratoga Street to Patton Road. Take a right onto Patton Road and a left onto Queenstown Street. Hospital is on the left.

Site #39 Transformer Near Bldg. 4250. Come back under Route 2. Take left onto Sheridan Road and a right onto Queenstown Street. Hospital is on the right.

Site #10 Construction Debris Area #1. Follow Perimeter Road until it intersects with Hospital Road. Turn left onto Hospital Road and then turn right on Givry Street. Take a right onto Jackson Road and turn left onto Patton Road. Bear right onto Sheridan Road and a right onto Queenstown Street. The hospital is on the left.

Site #11 Construction Debris Area #2. East on Lovell Street until it intersects with Hospital Road. Turn left onto Hospital Road and then turn right on Givry Street. Take a right onto Jackson Road and turn left onto Patton Road. Bear right onto Sheridan Road and a right onto Queenstown Street. The hospital is on the left.

Nashua River Study. Follow Perimeter Road until it intersects with Hospital Road. Turn left onto Hospital Road and then turn right on Givry Street. Take a right onto Jackson Road and turn left onto Patton Road. Bear right onto Sheridan Road and a right onto Queenstown Street. The hospital is on the left.



FORT DEVENS

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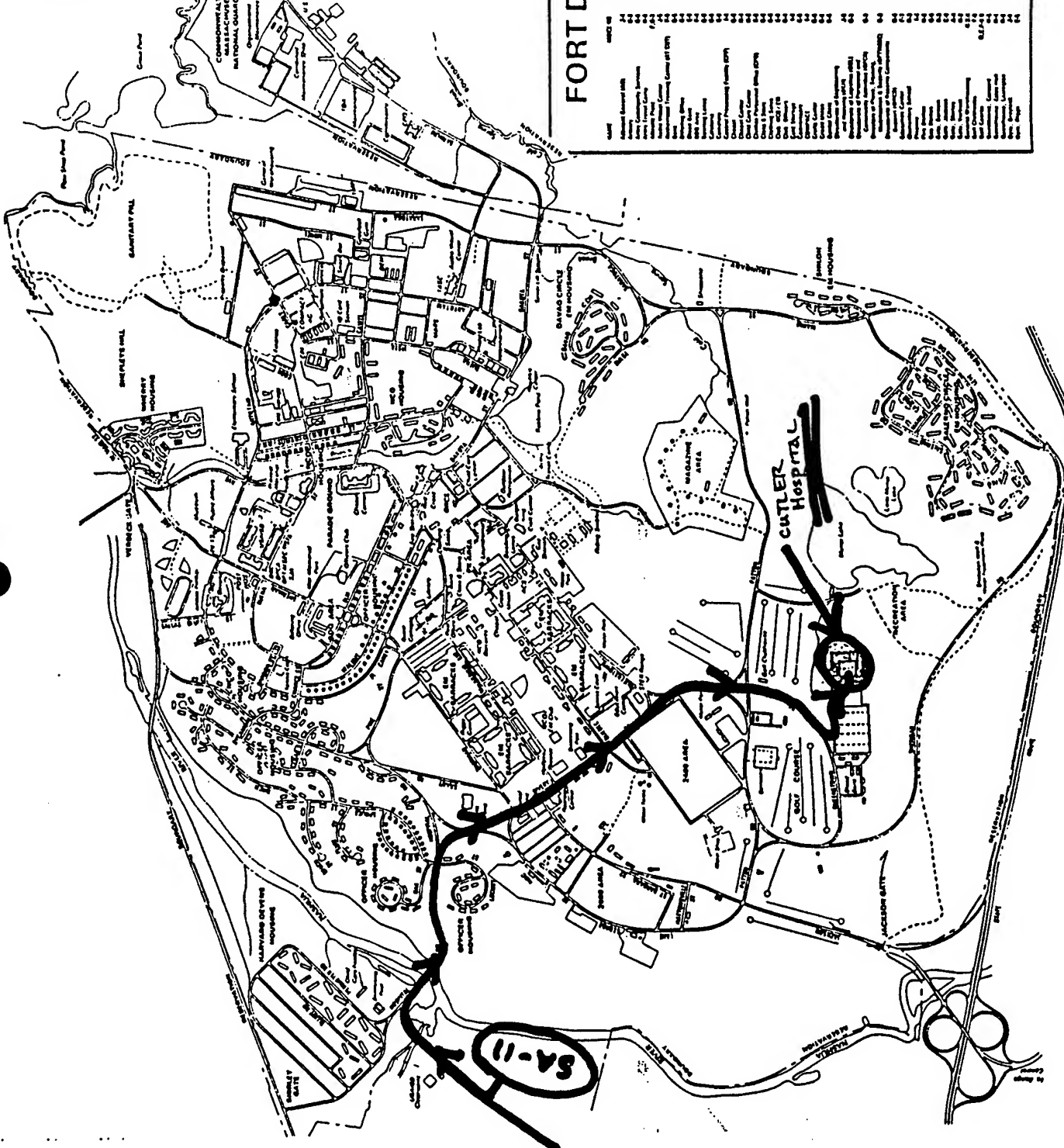


FIGURE 9-1
 ROUTES TO PRIMARY HOSPITAL
 FORT DEVENS, MASSACHUSETTS

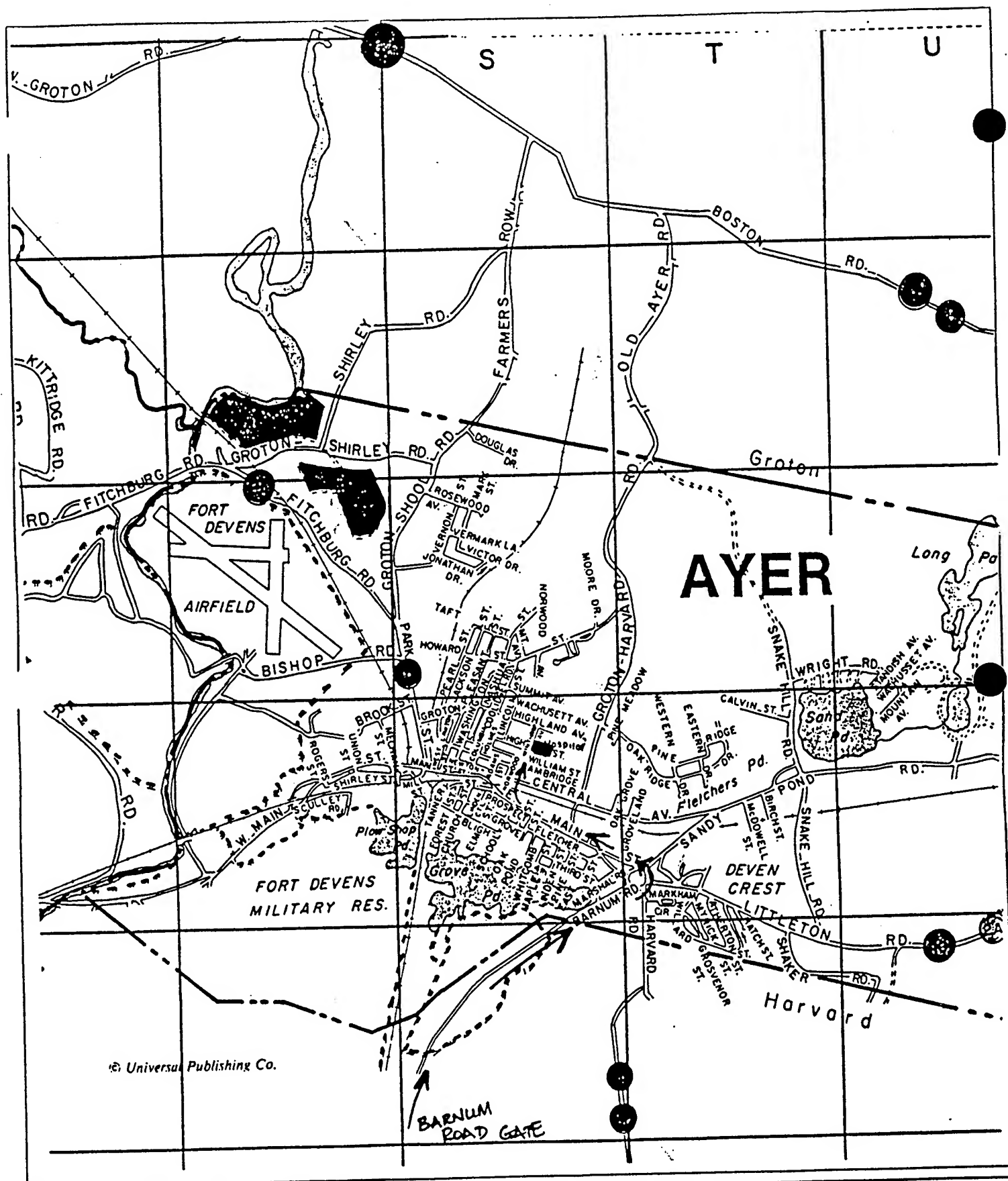


FIGURE
ROUTES TO SECONDARY HOSPITAL
FORT DEVENS, MASSACHUSETTS

**Site-Specific
Health and Safety Plan
Arthur D. Little, Inc.**

This plan is applicable for sites where the work involves unknown or uncharacterized chemical contamination. Please reference the Arthur D. Little Hazardous Waste Operation Health and Safety Program Plan for detail on the overall program. A copy of the most current Arthur D. Little Health and Safety Program Plan for Hazardous Waste Site Operations (April, 1992) and the Fort Devens Main Post Health and Safety Plan shall be available at the site in addition to other applicable documentation.

Job Name Fort Devens Site Investigation **Case No.** 67064

Site Location NR, Nashua River Study

Site History A study of the Main Post portion of the Nashua River and associated tributaries will be conducted to evaluate the environmental quality of the river, and potential environmental impacts to the river, as it flows past the Main Post.

Site Description/Nature of Work The scope of work for this study will include: records review; the collection of one surface water and sediment samples along the Nashua River channel; the collection of surface water and sediment samples from Pond Brook; the collection of surface water and three sediment samples from Trout Brook; and collection of surface water and two sediment samples from the wetlands immediately adjacent to Study Area 11.

A site plan is provided in the Work Plan for the Fort Devens Main Post SI.

Dig Safe and Other Utilities Notified N/A

By Whom N/A **Date** N/A

Response N/A

File Numbers N/A

Primary Level of Protection: Level D+

Contingency Level of Protection: N/A

Emergency Phone Numbers

ADL Health and Safety Office: Primary 800-677-3000 x6106 (C. Briggs), Alternate 800-677-3000 x6112 (P. Roy), Alternate 800-677-3000 x5884 (S. Stricoff)

Ambulance: 769-6911 **Fire:** 796-2220 **Police:** 796-3333

Hospital:

Name Culter Army Hospital

Address Building 3654 - Fort Devens

Hospital Phone Number 796-6911

Attach written directions and a map of the route to the nearest hospital (Attachment 1)

Other: Nashoba Community Hospital **Phone No.** 772-2657

Environmental/H&S - Bill Mullen **Phone No.** 796-3114

Location of Nearest Phone: _____

Site Hazards

Chemical Hazards (overview, include source and location of contaminants):

Unknown at this point in time. Assuming low concentrations which would not present a hazard to personnel.

Representative Chemicals

PEL/TLV/IDLH

N/A N/A

Factors Indicating the Nature of the Potential or Known Contaminants at the Site:

Site History: ✓ **Previous Sampling Results:** _____ **Current Use:** _____

Explain: _____

Major Routes of Exposure: Dermal primary; ingestion if good hygiene not practiced; potential eye exposure from splashing; potential injection from cuts caused by sharp objects.

Symptoms of Exposure/Potential Health Effects: None presently noted.

Physical Hazards

If drilling, the general types of hazards associated with a drill rig are present, namely, slips and falls, falling objects, hand, foot and back injuries, etc. If digging test pits, the additional hazards of a swinging backhole bucket, collapse of excavation, etc., exist.

Noise Hazards

The noise associated with operation of a drill rig or other heavy equipment can cause permanent, irreversible hearing loss. "Impact noise," such as that caused by driving a well point or split spoon with a drill rig hammer, is especially damaging. Proper hearing protection (ear muffs or plugs) must be worn when near a source of loud noise.

Fire Hazards: N/A

Electrical Hazards: N/A

Oxygen Deficiency: N/A

Confined Space Entry: Waterborne activities.

Radioactive Materials: N/A

Other Hazards: Heat stress, cold stress, environmental hazards (e.g., ticks, insects, etc.).

Personnel Health and Safety Requirements

Medical Monitoring Requirements. Site personnel must be participants in ADL's, or similar, medical monitoring program, and must have had their most recent exam within the previous 12 months. The exam must have indicated no medical restrictions that would inhibit personnel from performing the required work tasks.

Training Requirements. All site personnel must have the current 40 hours or 8 hours (refresher) of relevant health and safety training and/or experience which included coverage of hazard recognition, use of site monitoring instruments, use of personal protective equipment, etc. Personnel must also be oriented to the components of this site-specific plan. Attachment A shall be utilized to document training and physical examination records of site personnel. Attachment B shall be used to document orientation to this site-specific plan.

Site Health and Safety Procedures

Procedures for a Site "Walk-Over":

Practice contamination avoidance at all times; do not step in areas of obvious contamination; do not move unlabelled or unknown containers; do not kneel on ground, floor or other potentially contaminated surfaces; all efforts must be made to minimize contaminating clean work areas; wear proper personal protective equipment.

Procedures for Intrusive Site Work: (Drilling, Test Pits, etc.)

A. Personal Protective Equipment:

1. (a) PPE should be used on the site. (See the PPE Checklist attached to this plan; Attachment 2).

(b) Type of Respirator Cartridges: N/A

2. Additional Personal Protective Equipment:

B. Monitoring Equipment: N/A

C. Additional Safety Equipment: USCG-approved PFD for boat activities; PFD with rubber chest waders for non-boat activities.

D. Health and Safety Work Procedures:

1. Site Briefings: Conduct a daily briefing with site personnel and go over work objectives and the major elements of this plan.

- Tailgate Safety Meeting Form
- In Field Notebook

2. Site Control: Not real practical due to movement down river. Buddy system imperative.

3. Activity Specific Procedures:

(a) Task(s): Collect surface water and sediment samples.

Procedures: Don protective equipment (e.g., coated Tyvek, chest waders, PFD, gloves, etc.). Be extra careful conducting waterborne activities. Do not wear waders when in the boat. Use good sampling procedures; watch out for uneven surfaces.

Action Levels: N/A

3. (b) Task(s): Install staff gauges.

Procedures: Don proper protective equipment (e.g., safety glasses, leather/canvas gloves, boots); watch out for physical hazards, slips, trips, falls, etc.

Action Levels: N/A

Other tasks (if applicable) are attached.

4. Personnel and Equipment Decontamination:

- Remove gross contamination from tools, respirator, monitoring equipment, boots, etc. prior to leaving the work-site, using water, paper towels, hand-wipes, etc.
- Either completely decontaminate soiled equipment at the work-site using detergent and water (if possible), or wrap equipment in plastic bag for transport until complete decontamination is possible.
- Always follow established personal decontamination procedures and remove contaminated gloves, Tyvek suits, used cartridges, paper towels, etc. by placing in a plastic bag and arrange for proper disposal.
- Wash hands and face thoroughly with soap and water before lunch or coffee breaks, and as soon as practicable after finishing work for the day.
- Additional Decontamination: Follow decontamination procedures in the program plan if more extensive decontamination is needed.

Emergency Procedures

Personal Injury. If authorized, administer appropriate first aid. The injured may need to be transported to the nearest hospital. If possible, notify hospital in advance of incoming patient and nature of injury. If there is a question about whether it is safe to move the victim, DO NOT move the victim - instead, make him/her as comfortable as possible, and summon emergency assistance.

Chemical Exposure. If site personnel show signs of inhalation exposure, retreat to fresh air for recovery. If symptoms warrant, bring the injured to the nearest hospital for observation, and discontinue work at that location and consult with H&S representative.

In case of skin or eye irritation due to chemical contact, wash affected skin with soap and water, or flush eyes with generous amount of water. If irritation is serious, seek medical attention.

Fire. If the fire can be easily contained and extinguished, do so with a portable fire extinguisher. If explosion risk is present, do not attempt to extinguish - evacuate all personnel to a safe area and call the fire department (796-2220).

Spills. If safe to do so, contain the spill if materials and equipment are available. If these materials are not available or the release is beyond the capabilities of site personnel, contact local emergency responders who are trained and equipped to control and cleanup the release (796-2220).

Important Note: If site observations, sampling results, or any other information indicates the presence of chemical contaminants other than those specified herein, this health and safety plan becomes void, and a new plan must be prepared and approved!

The field logbook or Attachment D shall be completed to document daily health and safety activities in the study areas.

Project Manager _____

Health & Safety Plan Prepared By _____ **Date** _____

Health & Safety Plan Approved By _____ **Date** _____

Arthur D. Little, Inc. PPE Checklist

- ☐ 1. MSA Ultratwin full-face air-purifying respirator, in a protective plastic bag
- ☐ 2. Nose cup insert for MSA Ultratwin respirator
- ☐ 3. Ear-muff set which fits into hardhat
- ☐ 4. Optional: Eyeglass kit for MSA Ultratwin respirator
- ☐ 5. MSA cartridges for respirator OV/AG/HEPA (GMC-H)
- ☐ 6. Protective lenses cover for MSA Ultratwin respirator
- ☐ 7. Disposable ear plugs
- ☒ 8. Silvershield gloves
- ☐ 9. Natural rubber gloves
- ☒ 10. Nitrile gloves
- ☒ 11. Polyethylene Tyvek suit
- ☐ 12. Saranex Tyvek suit
- ☒ 13. Safety glasses with side shields
- ☒ 14. Goggles
- ☒ 15. Plastic disposal bags
- ☐ 16. Hardhat
- ☒ 17. Duct tape
- ☒ 18. Other (list below)
 - USCG-PFD; rubber chest waders.
 - Polyethylene Tyvek for 3a. only.
 - Standard work clothes or coveralls for other activities.

HASP, Fort Devens: Supplement A
Section No.: Appendix E
Revision No.: 1
Date: June 16, 1993

Appendix E: UXO Subcontractor Safety Plan and Procedures

**Site-Specific
Health and Safety Plan
Arthur D. Little, Inc.**

This plan is applicable for sites where the work involves unknown or uncharacterized chemical contamination. Please reference the Arthur D. Little Hazardous Waste Operation Health and Safety Program Plan for detail on the overall program. A copy of the most current Arthur D. Little Health and Safety Program Plan for Hazardous Waste Site Operations (April, 1992) and the Fort Devens Main Post Health and Safety Plan shall be available at the site in addition to other applicable documentation.

Job Name Fort Devens **Case No.** 67064

Site Location SA-51, O'Neil Building Spill Site

Site History This area has been used to refuel trucks and other vehicles, resulting in many fuel spills.

Site Description/Nature of Work The scope of work for this investigation includes: records review, collection of soil and ground water samples, using a Geoprobe® for TPH analysis.

Dig Safe and Other Utilities Notified Site cleared during 1993 site investigation; no utilities present.

By Whom _____ **Date** _____

Response _____

File Numbers _____

Primary Level of Protection: Level D+

Contingency Level of Protection: Level C

Emergency Phone Numbers

ADL Health and Safety Office: Primary (800)677-3000 x6106 (Corey Briggs), Alternate (800)677-3000 x6112 (Peter Roy), Alternate (800)677-3000 (Scott Stricoff)

Ambulance: (508) 769-6911 **Fire:** (508) 796-2220 **Police:** (508) 796-3333

Hospital:

Name Deaconess Nashoba Hospital

Address 200 Groton Road

Hospital Phone Number (508) 772-0200

Attach written directions and a map of the route to the nearest hospital (Attachment 1)

Other: Environmental/H&S - Jim Chambers **Phone No.** (508) 796-3114

Location of Nearest Phone: Cellular phone in field vehicle

Site Hazards

Chemical Hazards (overview, include source and location of contaminants):

Diesel fuel

Representative Chemicals	PEL/TLV/IDLH
<u>Petroleum hydrocarbons</u>	<u>100 ppm</u>
<u></u>	<u></u>
<u></u>	<u></u>
<u></u>	<u></u>

Factors Indicating the Nature of the Potential or Known Contaminants at the Site:

Site History: ☒ **Previous Sampling Results:** **Current Use:** ☒

Explain:

Major Routes of Exposure: Primarily dermal and inhalation, ingestion if good hygiene is not practiced, potential for ocular exposure from dust generation, and potential for injection from sharp objects.

Symptoms of Exposure/Potential Health Effects: See Attachment E

Physical Hazards

If drilling, the general types of hazards associated with a drill rig are present, namely, slips and falls, falling objects, hand, foot and back injuries, etc. If digging test pits, the additional hazards of a swinging backhole bucket, collapse of excavation, etc., exist.

Noise Hazards

The noise associated with operation of a drill rig or other heavy equipment can cause permanent, irreversible hearing loss. "Impact noise," such as that caused by driving a well point or split spoon with a drill rig hammer, is especially damaging. Proper hearing protection (ear muffs or plugs) must be worn when near a source of loud noise.

Fire Hazards: Solvents used for equipment decontamination

Electrical Hazards: Not anticipated

Oxygen Deficiency: Not anticipated

Confined Space Entry: Arthur D. Little prohibited from this type of work

Radioactive Materials: Not anticipated

Other Hazards: Heat stress, cold stress, environmental hazards (e.g. ticks, poison plants, insects...), truck traffic.

Personnel Health and Safety Requirements

Medical Monitoring Requirements. Site personnel must be participants in ADL's, or similar, medical monitoring program, and must have had their most recent exam within the previous 12 months. The exam must have indicated no medical restrictions that would inhibit personnel from performing the required work tasks.

Training Requirements. All site personnel must have the current 40 hours or 8 hours (refresher) of relevant health and safety training and/or experience which included coverage of hazard recognition, use of site monitoring instruments, use of personal protective equipment, etc. Personnel must also be oriented to the components of this site-specific plan. Attachment A shall be utilized to document training and physical examination records of site personnel. Attachment B shall be used to document orientation to this site-specific plan.

Site Health and Safety Procedures

Procedures for a Site "Walk-Over":

Practice contamination avoidance at all times, avoid walking in areas where obvious contamination is observed, do not move unlabelled containers, minimize contact with contaminated surfaces (e.g. kneeling...), minimize contaminating designated clean work areas, wear appropriate personal protective equipment.

Procedures for Intrusive Site Work: (Drilling, Test Pits, etc.)

A. Personal Protective Equipment:

1. (a) PPE should be used on the site. (See the PPE Checklist attached to this plan; Attachment 2).

(b) Type of Respirator Cartridges: Organic vapor/acid gas/HBBA (GMC-H)

2. Additional Personal Protective Equipment: _____

B. Monitoring Equipment: HNu or Microtip, combustible gas/oxygen meter. The field log book or Attachment C shall be used to document on site environmental monitoring.

C. *Additional Safety Equipment:* Not Applicable

D. *Health and Safety Work Procedures:*

1. Site Briefings: Conduct a daily briefing with site personnel and go over work objectives and the major elements of this plan.

- Tailgate Safety Meeting Form
- In Field Notebook

2. Site Control: Control work areas using any combination of barricade tape, road cones, etc. to prohibit the entry of unauthorized personnel, buddy system.

3. Activity Specific Procedures:

- (a) Task(s): Collect soil samples from Geoprobe®

Procedures: Don protective equipment (e.g. gloves, boots, Tyvek...), use good sampling technique, avoid kneeling in potentially contaminated soil, conduct continues monitoring in the breathing zone, upgrade to Level C if needed.

Action Levels: 10% of LEL, PID=background then Level D, PID=5 ppm above background for 5 min then Level C, PID>5 ppm (bkgd) or peak of 30 ppm or greater-stop operations, leave area.

- (b) Task(s): Collect ground water samples with Geoprobe®

Procedures: Don protective clothing (Tyvek, gloves, boots...), use proper sampling technique, conduct continues monitoring in the breathing zone, upgrade to Level C if needed.

Action Levels: 10% of LEL, PID=background then Level D, PID=5 ppm above background for 5 min then Level C, PID>5 ppm (bkgd) or peak of 30 ppm or greater-stop operations, leave area.

4. Personnel and Equipment Decontamination:

- Remove gross contamination from tools, respirator, monitoring equipment, boots, etc. prior to leaving the work-site, using water, paper towels, hand-wipes, etc.
- Either completely decontaminate soiled equipment at the work-site using detergent and water (if possible), or wrap equipment in plastic bag for transport until complete decontamination is possible.
- Always follow established personal decontamination procedures and remove contaminated gloves, Tyvek suits, used cartridges, paper towels, etc. by placing in a plastic bag and arrange for proper disposal.

- Wash hands and face thoroughly with soap and water before lunch or coffee breaks, and as soon as practicable after finishing work for the day.
- Additional Decontamination: Follow decontamination procedures outlined in the program plan if more extensive decontamination is required.

Emergency Procedures

Personal Injury. If authorized, administer appropriate first aid. The injured may need to be transported to the nearest hospital. If possible, notify hospital in advance of incoming patient and nature of injury. If there is a question about whether it is safe to move the victim, DO NOT move the victim - instead, make him/her as comfortable as possible, and summon emergency assistance.

Chemical Exposure. If site personnel show signs of inhalation exposure, retreat to fresh air for recovery. If symptoms warrant, bring the injured to the nearest hospital for observation, and discontinue work at that location and consult with H&S representative.

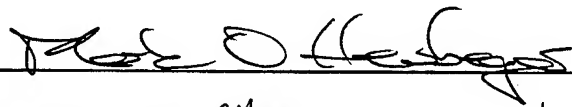
In case of skin or eye irritation due to chemical contact, wash affected skin with soap and water, or flush eyes with generous amount of water. If irritation is serious, seek medical attention.

Fire. If the fire can be easily contained and extinguished, do so with a portable fire extinguisher. If explosion risk is present, do not attempt to extinguish - evacuate all personnel to a safe area and call the fire department ((508) 796-2220).

Spills. If safe to do so, contain the spill if materials and equipment are available. If these materials are not available or the release is beyond the capabilities of site personnel, contact local emergency responders who are trained and equipped to control and cleanup the release ((508) 796-2220).

Important Note: If site observations, sampling results, or any other information indicates the presence of chemical contaminants other than those specified herein, this health and safety plan becomes void, and a new plan must be prepared and approved!

The field logbook or Attachment D shall be completed to document daily health and safety activities in the study areas.

Project Manager  8/4/94
 Health & Safety Plan Prepared By Mary Greenwood Date 8/4/94
 Health & Safety Plan Approved By Cory Briggs Date 8/8/94

Arthur D. Little, Inc. PPE Checklist

- ☒ 1. MSA Ultratwin full-face air-purifying respirator, in a protective plastic bag
- ☒ 2. Nose cup insert for MSA Ultratwin respirator
- ☒ 3. Ear-muff set which fits into hardhat
- ☒ 4. Optional: Eyeglass kit for MSA Ultratwin respirator
- ☒ 5. MSA cartridges for respirator OV/AG/HEPA (GMC-H)
- ☐ 6. Protective lenses cover for MSA Ultratwin respirator
- ☒ 7. Disposable ear plugs
- ☒ 8. Silvershield gloves
- ☐ 9. Natural rubber gloves
- ☒ 10. Nitrile gloves
- ☒ 11. Polyethylene Tyvek suit
- ☐ 12. Saranex Tyvek suit
- ☒ 13. Safety glasses with side shields
- ☐ 14. Goggles
- ☒ 15. Plastic disposal bags
- ☒ 16. Hardhat
- ☒ 17. Duct tape
- ☐ 18. Other (list below)

**Site-Specific
Health and Safety Plan
Arthur D. Little, Inc.**

This plan is applicable for sites where the work involves unknown or uncharacterized chemical contamination. Please reference the Arthur D. Little Hazardous Waste Operation Health and Safety Program Plan for detail on the overall program. A copy of the most current Arthur D. Little Health and Safety Program Plan for Hazardous Waste Site Operations (April, 1992) and the Fort Devens Main Post Health and Safety Plan shall be available at the site in addition to other applicable documentation.

Job Name Fort Devens Site Investigation **Case No.** 67064

Site Location AOC-11, Construction Debris Area

Site History The site was used temporarily as a landfill. The majority of refuse disposed of at this location consisted of construction debris.

Site Description/Nature of Work A portion of the site is wetlands and a portion is a debris disposal area. Activities to be performed are: Unexploded ordnance clearance, soil borings (5), well installation (5), test pit excavation (4), soil sampling, surface water, sediment sampling, ambient air sampling, and ground water sampling.

Dig Safe and Other Utilities Notified Area previously cleared during 1993 site investigation; no utilities present

By Whom _____ **Date** _____

Response _____

File Numbers _____

Primary Level of Protection: Level D+

Contingency Level of Protection: Level C (if action levels are reached)

Emergency Phone Numbers

ADL Health and Safety Office: Primary (800) 677-3000 X6106 (C. Briggs), Alternate X6112 (P. Roy), Alternate X5884 (S. Stricoff)

Ambulance: (508) 769-6911 **Fire:** (508) 796-2220 **Police:** (508) 796-3333

Hospital:

Name Deaconess Nashoba Hospital

Address 200 Groton Road

Hospital Phone Number (508) 772-0200

Attach written directions and a map of the route to the nearest hospital (Attachment 1)

Other: Environmental/H&S - Jim Chambers Phone No. (508) 796-3114

Location of Nearest Phone: Cellular phone in field vehicle

Site Hazards

Chemical Hazards (overview, include source and location of contaminants):

PCBs, VOCs, and explosives

Representative Chemicals	PEL/TLV/IDLH
<u>PCBs</u>	<u>0.5 - 1 mg/m³</u>
<u>Trichlorobenzene</u>	<u>0.5 mg/m³</u>
<u>TCE</u>	<u>5ppm (ceiling) 50ppm</u>
<u>PCE</u>	<u>1.5 mg/m³ (inh)</u>
<u>TNT</u>	<u>0.5 mg/m³ (dermal)</u>

Factors Indicating the Nature of the Potential or Known Contaminants at the Site:

Site History: Previous Sampling Results: ☒ Current Use: _____

Explain: The site was used as a temporary land fill and received primarily construction debris.

Major Routes of Exposure: Primary - Dermal and inhalation; secondary - ingestion (if good hygiene not practiced), ocular (from potential dust generation), and injection (puncture wounds from sharp objects), blunt trauma - explosive

Symptoms of Exposure/Potential Health Effects: Dizziness, headache, nausea, euphoria, fatigue, unconscienceness, death (from chemical exposure and/or concussion resulting from UXO explosion)

Physical Hazards

If drilling, the general types of hazards associated with a drill rig are present, namely, slips and falls, falling objects, hand, foot and back injuries, etc. If digging test pits, the additional hazards of a swinging backhole bucket, collapse of excavation, etc., exist.

Noise Hazards

The noise associated with operation of a drill rig or other heavy equipment can cause permanent, irreversible hearing loss. "Impact noise," such as that caused by driving a well point or split spoon with a drill rig hammer, is especially damaging. Proper hearing protection (ear muffs or plugs) must be worn when near a source of loud noise.

Fire Hazards: Not anticipated

Electrical Hazards: Overhead power lines and underground power lines

Oxygen Deficiency: Not anticipated

Confined Space Entry: ADL prohibited from this type of work

Radioactive Materials: Not anticipated

Other Hazards: Heat stress, cold stress, environmental hazards (e.g., ticks, insects, etc.)

Personnel Health and Safety Requirements

Medical Monitoring Requirements. Site personnel must be participants in ADL's, or similar, medical monitoring program, and must have had their most recent exam within the previous 12 months. The exam must have indicated no medical restrictions that would inhibit personnel from performing the required work tasks.

Training Requirements. All site personnel must have the current 40 hours or 8 hours (refresher) of relevant health and safety training and/or experience which included coverage of hazard recognition, use of site monitoring instruments, use of personal protective equipment, etc. Personnel must also be oriented to the components of this site-specific plan. Attachment A shall be utilized to document training and physical examination records of site personnel. Attachment B shall be used to document orientation to this site-specific plan.

Site Health and Safety Procedures

Procedures for a Site "Walk-Over":

Practice contamination avoidance at all times; do not step in areas of obvious contamination; do not move unlabelled or unknown containers; do not kneel on the ground, floor, or other potentially contaminated surfaces; all efforts must be made to minimize contaminating clean work areas; wear proper personal protective equipment.

Procedures for Intrusive Site Work: (Drilling, Test Pits, etc.)

Intrusive work will be completed after UXO clearance.

A. Personal Protective Equipment:

1. (a) PPE should be used on the site. (See the PPE Checklist attached to this plan; Attachment 2).

(b) Type of Respirator Cartridges: Organic vapor/acid gas/HEPA (GMC-H)

2. Additional Personal Protective Equipment: N/A

B. Monitoring Equipment: PID, Combustible Gas Indicator

C. Additional Safety Equipment: N/A

D. Health and Safety Work Procedures:

1. Site Briefings: Conduct a daily briefing with site personnel and go over work objectives and the major elements of this plan.

- Tailgate Safety Meeting Form
- In Field Notebook

2. Site Control: Control work area using any combination of barricade tape, road cones, saw horses, etc. to prohibit the entry of unauthorized personnel; use the buddy system.

3. Activity Specific Procedures:

- (a) Task(s): Advance soil borings/excavate test pit and collect soil samples.

Procedures: Don protective equipment (hardhats a necessity); conduct all excavations in accordance with OSHA procedures with proper shoring of sides to reduce the chance of cave-in; do not stand near the edge of the trench; do not enter the excavation; periodically monitor the area for airborne contamination; if odors are noted, upgrade to Level C and continue monitoring; cordon off the area with barricade tape, road cones, etc.; keep unauthorized personnel from the work area.

Action Levels: 19.5%-O₂; 10% of LEL; PID-bkgd=D; PID-bkgd-5 ppm for 5 min.=C; PID->5 ppm for 5 minutes or peak of 30 ppm or greater, stop operations; RAD->2 mR/hr+stop work; leave area.

3. (b) Task(s): Collect surface water and sediment samples

Procedures: Don protective equipment (e.g., PFD chest waders, gloves, goggles, etc.); use good sampling procedures; use extra care when walking in shallow (e.g., uneven surfaces, holes, etc.). Use buddy system at all times.

Action Levels: N/A

3. (c) Task(s): UXO clearance by UXO subcontractor.

Procedures: All work in accordance with UXO subcontractor's H&S plan and SOPs.

Action Levels: All work in accordance with UXO subcontractor's H&S plan and SOPs.

3. (d) Task(s): Collect subsurface soil samples.

Procedures: Don protective equipment (e.g., gloves, eye protection, etc.); use good drilling and sampling procedures; practice contamination avoidance; periodically monitor the bore hole with the PID; if odors are noted, upgrade to Level C and continue to monitor.

Action Levels: 19.5%-O₂; 10% of LEL; PID-bkgd=D; PID-bkgd-5 ppm for 5 min.=C; PID->5 ppm for 5 minutes or peak of 30 ppm or greater, stop operations; RAD->2 mR/hr+stop work; leave area.

3. (e) Task(s): Collect ground water samples

Procedures: Don protective equipment (e.g., gloves, eye protection, etc.); use good sampling procedures; practice contamination avoidance; periodically monitor the monitoring well and breathing zone; if odors are noted, upgrade to Level C and continue to monitor.

Action Levels: 19.5%-O₂; 10% of LEL; PID-bkgd=D; PID-bkgd-5 ppm for 5 min.=C; PID->5 ppm for 5 minutes or peak of 30 ppm or greater, stop operations; RAD->2 mR/hr+stop work; leave area.

4. Personnel and Equipment Decontamination:

- Remove gross contamination from tools, respirator, monitoring equipment, boots, etc. prior to leaving the work-site, using water, paper towels, handi-wipes, etc.
- Either completely decontaminate soiled equipment at the work-site using detergent and water (if possible), or wrap equipment in plastic bag for transport until complete decontamination is possible.

- Always follow established personal decontamination procedures and remove contaminated gloves, Tyvek suits, used cartridges, paper towels, etc. by placing in a plastic bag and arrange for proper disposal.
- Wash hands and face thoroughly with soap and water before lunch or coffee breaks, and as soon as practicable after finishing work for the day.
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In case of skin or eye irritation due to chemical contact, wash affected skin with soap and water, or flush eyes with generous amount of water. If irritation is serious, seek medical attention.

Fire. If the fire can be easily contained and extinguished, do so with a portable fire extinguisher. If explosion risk is present, do not attempt to extinguish - evacuate all personnel to a safe area and call the fire department (508-796-2220).

Spills. If safe to do so, contain the spill if materials and equipment are available. If these materials are not available or the release is beyond the capabilities of site personnel, contact local emergency responders who are trained and equipped to control and cleanup the release (508-796-2220).

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The field logbook or Attachment D shall be completed to document daily health and safety activities in the study areas.

Project Manager Robert O. Heuberg 8/4/94

Health & Safety Plan Prepared By Mary Greenwood Date 8/4/94

Health & Safety Plan Approved By Conny Burger Date 8/8/94

Arthur D. Little, Inc. PPE Checklist

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- ☒ 4. Optional: Eyeglass kit for MSA Ultratwin respirator
- ☒ 5. MSA cartridges for respirator OV/AG/HEPA (GMC-H)
- ☐ 6. Protective lenses cover for MSA Ultratwin respirator
- ☒ 7. Disposable ear plugs
- ☒ 8. Silvershield gloves
- ☐ 9. Natural rubber gloves
- ☒ 10. Nitrile gloves
- ☒ 11. Polyethylene Tyvek suit
- ☐ 12. Saranex Tyvek suit
- ☒ 13. Safety glasses with side shields
- ☐ 14. Goggles
- ☒ 15. Plastic disposal bags
- ☒ 16. Hardhat
- ☒ 17. Duct tape
- ☒ 18. Other (list below)

**ENVIRONMENTAL HAZARDS SPECIALISTS
INTERNATIONAL, INC.**

Route 1, Box 232
Belvidere, North Carolina 27919
Phone (919) 297-2991
FAX (919) 297-2992

**ENVIRONMENTAL HAZARDS SPECIALISTS, INT. INC.
EXPLOSIVE ORDNANCE DISPOSAL**

**UNEXPLODED ORDNANCE (UXO/OEW) FIELD OPERATIONS
WORK PLAN**

and

SAFETY, HEALTH, AND EMERGENCY RESPONSE PLAN

Contract: DAAA15-91-D-0015
Delivery Order 0004

Purchase Order Numbers: 571292


Tasks:

1. Attend Site Visit at Fort Devens
 - a. Conduct a Walkover and Visual Inspection
 - b. Provide conclusions and recommendations
 - c. Provide Downhole Clearance for up to (8) boring locations
 - d. Provide (1) EHSI Technician to observe test pit operations at the landfill
 - e. Provide after action report

Client Name: U.S.A.E.C., Aberdeen, Maryland

Prime Contractor: Arthur D. Little, Cambridge, Mass.

Project Location: Fort Devens, MA.

Date Prepared 4/10/93 Prepared
by: 
Charles E. Wharton, Sr.

Safety Review Date; _____ Approved
By; _____

Mark Heuberger, Program Manager
Arthur D. Little, Inc.

ENVIRONMENTAL HAZARDS SPECIALISTS INTERNATIONAL, INC.

Route 1, Box 232
Belvidere, North Carolina 27919
Phone (919) 297-2991
FAX (919) 297-2992

April 10, 1993

Company Confidential
UXO Work Plan Addendum
Methodology Plan

Access and Soil Boring Activities UXO Downhole Clearance Underwater Inspection and Sampling at Fort Devens

1. INTRODUCTION

The EHS team has extensive experience with Explosive Ordnance Disposal Operations, and Ordnance Clearance and survey operations of sites contaminated with hazardous waste. The staff is highly skilled, former military Explosive Ordnance Disposal personnel backed by a professional staff. All are highly aware of the risks and hazards involved with these projects. All EHS Site Supervisors have more a minimum 15 years of supervising EOD projects, and have extensive management and range clearance experience. EHS uses U. S. Navy SOPs as the staff are familiar with these procedures. In addition, based on our many years of experience as Explosive Ordnance Disposal Specialists, our personnel are well equipped to deal with the unique challenge of locating and removing UXOs both on the surface, subsurface and underwater. This section provides information on the general management and technical approach that will be implemented to support the Hazardous Waste Field Activities at the Fort Devens Site.

The logistic requirements and standard emergency action procedures are discussed.

1.1. MANAGEMENT ORGANIZATION

EHS management will ensure that all operations are carried out correctly, safely and effectively. The responsibilities and authority of the key management and operational personnel identified are discussed in subsections that follow.

1.1.1. Key Management Personnel

The key upper level management personnel is the EHS Program Manager. The general responsibility he has is defined below:

° EHS Program Manager - Charles E. Wharton

Responsible for overall program management and coordination, contract administration, and contract application of necessary resources to ensure project completion.

1..1..2. Key Operational/Safety Personnel

All on-site operations requiring EHS personnel, material, or machines and all authorized personnel will be under direct supervision and control while on site. Because of the extensive EOD training and experience of EHS personnel, the on-site ordnance safety program will be directed and administered by EHS. The key EHS personnel will be responsible for on-site clearance operations and ordnance safety.

All key EHS personnel have been fully EOD-trained at the U.S. Naval School EOD, and have extensive experience in military EOD range clearance operations. Collectively and individually, these personnel have the responsibility and authority to correct problems, stop work, or take appropriate action to prevent accidents (explosive or industrial) whenever an unsafe condition is observed or foreseen. All personnel are familiar with the U.S. Military 60-series EOD publications, identification guides, and associated safety publications.

The specific responsibilities and authority of these personnel are defined below:

EHS Site Supervisor

Reporting to the EHS Program Manager, the Site Supervisor is responsible for the direction and coordination of all daily operations, including the assignment and supervision of required personnel to clear and prepare areas for the survey activity. He will ensure that the procedures used comply with Search and Excavation SOP's, including recording required data. In an emergency, the Site Supervisor through the on-site Health and Safety Officer is responsible for directing initial action until the arrival of local emergency response teams. Also in support of the on-site Safety Officer, the EHS Site Supervisor is responsible for the implementation and day-to-day administration of safety procedures and for coordinating and conducting all general, procedural, and safety training specified herein. He will control all procedures pertaining to safety during on-site search/clearance excavation, handling and disposal of ordnance, and any other activities requiring EHS personnel or equipment on-site.

Commensurating with this responsibility, he has the authority to stop all on-site activity when an unsafe condition develops and to prevent admittance to the site of unauthorized personnel when operations are in progress. In the event of an accident or other emergency situation, he will coordinate with the Health & Safety Officer all on-site emergency operations and direct the implementation of emergency procedures, including notifying local authorities and submitting required reports. In addition, he will ensure the performance of weekly equipment maintenance checks, update required maintenance and training records, conduct periodic safety inspections of personnel and equipment, and observe survey operations.

EHS EODHAZMATTECHS

Reporting to the EHS Site Supervisor, the EOD/HAZMATTECH is directly responsible to ensure that areas being investigated are clear of UXO hazards and that safe access is available. He will also inspect and observe operations being undertaken in such areas to ensure adherence to procedures, compliance with safety requirements, and the well-being of the survey team members. In the event of an emergency in their area, they will initiate immediate emergency procedures until relieved by the Safety Officer.

1..2. GENERAL TECHNICAL APPROACH

Based on the experience EHS has gained during Military clearance operations, previous Survey/Clearance projects both for USATHAMA, U.S. Army Corps of Engineers and private industry, EHS will assist this project utilizing the following approach.

1..2..1. Record Review

Using the data, records, and points of contact interviewed, EHS will assess with Contractor all available information on the use of the project site. The information will be evaluated and combined with the actual clearance data obtained on site to generate as complete a picture as possible of the levels, types, and boundaries of ordnance-related contamination within the project site.

1..2..2. Clearance of Designated Areas

A surface visual sweep team, consisting of a minimum of two EOD trained specialists will conduct a visual search and clearance of the designated areas. Hazardous UXO items located visually by the sweep team members will be marked with stakes. Hazardous UXO items removal will be conducted by either "(NOTE 1)" No recovery, render safe, excavation, or disposal of any UXO shall be effected under this contract. If explosives contamination or UXO is encountered, UXO personnel shall initiate necessary safety measures and immediately notify the ADLS FOL. Unexploded ordnance items and ordnance debris will be collected. Unexploded ordnance that can be safely moved will be placed at a designated ordnance holding area and dealt with in accordance with the Standard Operating Procedures as agreed with the COR.

Site Perimeter Determination and Surface Sweep Procedures

1. Using marking stakes and lines as necessary, mark the outer perimeter of each site to be surveyed. Additional footage may be added to the perimeter to ensure complete coverage.
2. Clear the area of miscellaneous surface scrap metal and/or ordnance items.

3. Conduct a geophysical survey and perform escort service at the Fort Meade Boring Sites.
4. Using marking stakes and lines as necessary, mark the outer perimeter of the suspected contaminated areas.

1..2..3. Geophysical Survey Equipment

The EHS survey team will conduct a surface and subsurface electromagnetic search of the designated sites. All of the equipment is owned by EHS. The Foerster Electromagnetic Detector (MK 26 Ordnance Locator) and White/Eagle\Schonstedt will be used for the surface and subsurface survey. The MK 26 is the most recent military approved locator and is in use by the U.S. Military EOD forces for detecting subsurface ordnance items. The locator is a hand-held unit and uses 2 fluxgate magnetometers, aligned and mounted a fixed distance apart to detect changes in the earth's ambient magnetic field caused by ferrous metal or disturbances caused by soil conditions. Both an audio and metered signal are provided to the operator. The metered signal indicates whether the disturbance is geodetic or metal-related. The detection capability of the MK 26 is dependent on the size of the item versus its depth and on the experience of the operator. This unit is used in the borehole and U/W mode.

In general terms, the MK 26 will easily detect a 60 mm projectile to a depth of 3 meters and a 155 mm projectile to 6 meters. The EOD specialist will use the MK 26 and search along one side of the grid line for subsurface contamination. When a contact is found, the specialist will check with his hand to determine if the contact is on or just below the surface. If the contact is buried, the ordnance locator operator will mark the spot and continue until the fade out zone is established for each contact. Any excavations deemed necessary (NOTE 1) will be accomplished by hand or with hand tools and in accordance with standard EOD procedures. Items located by the UXO team will be marked and subsurface diagnosis will be performed by the Fort Meade EOD Team with tools that are non-sparking to minimize any sparks. An EOD technician will be present to ensure safety and to verify all excavations. The items will then be recorded on the survey grid data sheets.

1..3. Soil Boring and Sampling

EHS will be present during all field operations and will clear access to all locations where activity is taking place. Sampling at the project site will be conducted using standard EOD procedures and the ADL sampling plan and safety precautions. Many of the sites have had explosive, or incendiary ordnance detonated, burned or buried throughout the many years of operations. The general approach for preparing a site for collecting survey data required for ADL will be as follows:

1..3..1. Soil Boring, Soil Sampling Locations

In advance of soil boring installation, EHS EOD specialists will surface sweep the access to the boring sites, a minimum access way of 25' and site area of approximately 70 feet in diameter and 20' deep at the soil boring locations cleared of any UXO as per the Standard Operating Procedures. Both ferrous and nonferrous locators will be used to assist in achieving a high effectiveness of the surface sweep. Borings that are to be installed on Demolition/Burn ranges or impact ranges should be surface cleared initially, and every (2) two feet after or as directed, PVC will be installed and the auger will be removed and the probe of the MK26 lowered to clear another (2) two feet. This procedure will be followed at a minimum to a maximum depth of (20) feet on all impact ranges and ranges that ordnance was buried before being detonated.

1..3..2. Trench Excavations (NOTE) (not required on this tasking, included for information purposes only.)

1..3..3. General

EHS personnel will conduct the excavations at the designated sites. The mechanized equipment used will excavate in a precise manner at the locations, (about 6" per sweep until contact is made with dumped material). At this point, if required, hand digging will be initiated to identify the contact, and depending upon the outcome, the excavation may continue until the surface of the waste dump is explored. On identification of the nature of the waste, the appropriate SOP will be activated to take waste samples. Should the nature of the waste be highly hazardous or toxic, a remote method (can) will be used to extract the sample and place it in an appropriately designed container.

1..3..4. Site/Pit Excavation Procedures

1. Plan and mark out a path for a trench to be dug out through the middle of the burial site. The trench will be the width of the back hoe/bucket and will continue down until the bottom/or water of the burial site is determined.
2. Initial excavation will be conducted by hand or using hand tools to carefully remove the dirt surrounding the suspected UXO until positive identification can be made. If deemed necessary, remote handling equipment may be required.
3. Once located, carefully identify the exposed UXO to determine safety factors to be considered for removal.
4. Remove all unnecessary personnel from the area.

" (NOTE 1)" No recovery, render safe or disposal of any UXO shall be effected under this contract. If explosives contamination or UXO is encountered, UXO personnel shall initiate necessary safety measures and immediately notify the ADL FOL representative.

5. Slowly lift the UXO from the excavation and place it on the surface next to the trench.
6. Follow on Excavation - following positive identification/determination of explosive/chemical hazard of UXO removed from a pit, and upon recommendation by EHS, excavation procedures may be modified to permit use of mechanical equipment for the excavation of dirt surrounding the UXO. In this instance, the following procedures will be used.
 - Position the equipment such that the UXO to be uncovered can be approach from the side.
 - Carefully remove dirt from the side of the UXO until it is partially or nearly exposed.
 - Revert to hand tools for final excavation. If, during the course of the excavation/removal of UXO from the pit area, other UXO or bulk explosive/propellant/chemical materials are found, they will be removed and handled in accordance with the approved SOP.
7. The excavated material will be placed in an isolated area within the existing site. EHS will catalog all ordnance related metal found and estimate the various types and quantities found. The excavation activities will take place on a day when the winds are calm to minimize dispersion of the materials.
8. If any drums are discovered, normal excavation activities will stop. Unnecessary personnel will retreat at least 100 feet up wind from the vicinity of the drums. OVA and/or HNU analyzers will monitor the air near the drums. If any unusual readings are exhibited, then necessary personnel will wear protective clothing appropriate for the hazard.(NOTE: The ADL Sampling Plan will be utilized) The dirt around the drums will be removed. Personnel will carefully move the drum from the excavation pit. The drum will be overpacked. Qualified personnel will identify the contents and properly store the drum at a designated location on site or at any other appropriate location at the work site.
9. Safety of personnel and equipment is foremost in the EHS International, Inc. management and operational philosophy. Fully trained supervisory personnel are directly involved in all operations. They have the experience and responsibility to identify potentially hazardous situations. The Site Supervisor, Safety Officer, and EOD Technicians have the authority and responsibility to immediately stop work and take corrective action when an unsafe situation is encountered. Standard EOD procedures will be employed in the investigation/handling of ordnance related items until it is determined that no explosive hazard exists.
10. Restoration

After each burial pit has been cleared of exposed UXO and metallic debris, the area will be filled in to conform with the surrounding terrain.

1..3..5. Personal Protective Clothing and Vapor Monitoring Procedures

1. The level of protective clothing required for this operation is dependent upon the hazard analysis. No intrusive activities are planned. The level required for scraping and excavating in areas not known or suspected of having been contaminated with army chemical agents or chemical munitions will be determined in accordance with the ADL Health and Safety Plan. This will normally be either Level B or C, with the provision for upgrading/downgrading as necessary.
2. All trenching/excavating/soil movement in work areas will be accomplished in (Level B). Continuous monitoring with OVA/HNU will be required. Negative results will not automatically be used to justify downgrading of protective clothing. Elevated readings on the OVA/HNU will result in the stopping of work and a decision whether to evacuate or continue work in elevated levels of protective clothing.

1..3..5..1. EHS ESCORT

EHS will escort ADL personnel doing soil and water sampling, and Geophysical surveys (if requested) to ensure maximum safety during the operations. In the case of soil sampling, ordnance locators will be used in sample areas prior to a soil sample being extracted.

1..3..6. FACILITIES AND EQUIPMENT

To support the overall project, facilities and equipment will be marshalled as indicated in the following paragraphs.

1..3..7. Support Equipment

The equipment listed below will be utilized for general operations support and emergency support:

- ° Communications - On site communications for normal or emergency operations will be provided by portable transceivers provided to key personnel. A commercial land line or mobile telephone will be available for direct communications.
- ° Vehicles - One passenger vehicle will be available on-site for general administration and logistic use.

1..4. Detection/Excavation, and Clearance Equipment/Material

Ordnance detection will be accomplished using the Foerster (MK 26) ordnance locator, schonstedt, plus a White/Eagle low frequency locator, all of which are owned and maintained by EHS.

1..4..0..1. Miscellaneous Equipment List

Gloves

Boots

Mosquito Lotion

Safety Glasses

Helmets/Hard Hats (Note: hard hats will not be worn when dealing
with suspected UXO's)

Tools, Hand

Tape, black

Chain with hooks

Shovels, spade and flat, short and long handle

Support for both diesel and gas

Tire repair, equipment repair

Phone service

Surveyor's tape, all colors

3 pkgs of stakes

2 coils of line, 1/2 inch

starting fluid

250' surveyor's tape

Decon tubs, 2 cases bleach

1..4..0..2. Clothes for Working

Day / Size

Yellow boots	2 Pr	Large
--------------	------	-------

Tyvex	2 Pr	Large
-------	------	-------

Saranex	2 Pr	Large
Filters	1 Pr	- Purple
Respirators	1 Ea	
Tape	1 Case	
Coveralls	1 Ea	
Boots, Knee	3 Pr	
Inner gloves	2 Pr	
Outer gloves	2 Pr	

1..5. STANDARD PROCEDURES

The following paragraphs provide general information on routine administrative and operating procedures to be used by EHS while on site.

1..5..1. Personnel Employment

Equal employment opportunity will be provided for the local area laborers (not) required for this project. However, due to the nature of the task and the hazards expected, consideration of the areas listed below will be necessary:

- Physical Conditioning - Potential hires will be thoroughly briefed as to the physical nature of the work and the potential hazards.
- Known allergies - Personnel will be asked to list all known allergies or previous reactions to insect bites or medication.

Following employment, the conditions listed below constitute grounds for termination and will result in dismissal:

- Failure to attend training sessions immediate dismissal with no pay) or daily briefings (dismissal after one warning).
- Possession of or being under the influence of alcohol or drugs at the site (immediate dismissal).
- Failure to comply with prescribed safety procedures/regulations (i.e., smoking in an unauthorized area, failure to wear protective clothing, etc.) (dismissal after one warning).
- Malingering (dismissal after one warning).
- Unexcused absence (dismissal after one warning).

1..5..2. General Procedures and Daily Routine

The general procedures and daily routine prescribed below will be followed while working on the site. These procedures and routines (except those that concern safety) may be altered by the Safety Officer as deemed appropriate to maximize productivity and to facilitate additional personnel training, if required.

1..5..2..1. On-Site Restrictions

During on-site operations, several restrictions will be imposed on the contractor and authorized visitors. These restrictions are:

- Access - Will be limited to the contractor or authorized visitors and only via the office facilities.
- Vehicles - Only contractor vehicles will be permitted on the site where ordnance-related activities are in progress.
- Unauthorized Vehicles/Personnel - Any observed on the site will be reported to the Safety Officer via radio. If continuation of work poses a hazard to unauthorized personnel, work will be stopped. Note: It is recognized that control of unauthorized personnel at some sites will be difficult and subject to the cooperation of the authorities.

1..5..2..2. Daily Routine

The on-site daily routine to be used is as follows:
(tentative)

- Working Hours
 - It is assumed that ADL will be working 10 hour work days Monday-Friday
 - Saturday/Sunday off
- Rest Periods - two fifteen minute rest periods and a 30-minute lunch break. (Additional on-station rest periods at the discretion of the Site Supervisor.
- Daily Briefings, Tailgate
 - The designated Safety Officer will brief the Team members on work planned for that day and provide other pertinent information.

1..5..2..3.

Safety and Maintenance Inspections

Several types of safety and maintenance inspections will be conducted on-site by the EHS Site Supervisor, Safety Officer at varying frequencies. Table 1-1 provides information on the types and frequency of these inspections. Checklists for these inspections will be provided at the work site.

In addition to the inspection listed, the Site Supervisor/Safety Officer will conduct random inspections of all types at least once each week.

Table 1-1

SAFETY AND MAINTENANCE INSPECTIONS

TYPE	NAME	FREQUENCY			RESPONSIBILITY	REMARKS
		DAILY	WEEKLY	MONTHLY		
M	Vehicle	X			Operator	Each vehicle
S	Protective clothing	X			Site Supervisor	
M	First Aid Equipment		X		Site Supervisor	Each Kit
M	ABC Extinguisher			X	Site Manager	
S	Fire Hazards	X			All Key Personnel	
S	Operational	X			All Key Personnel	
M	MK 26	X			Operator	
M	White/Eagle	X			Operator	

S = Safety

M = Maintenance

Quality Control Procedures

Sweep Effectiveness

* Sweep effectiveness measures the effectiveness of the clearance effort being conducted. It is an indicator of the thoroughness of the search methods being utilized by the UXO contractor. An effective QCP is an integral part of the overall program. The following actions are used to administer the program.

- (1) Items of inert ordnance will be on site with the Site Supervisor.
- (2) Areas to be swept will have these items placed in various locations.
- (3) The Site Supervisor will monitor the items that are located.
- (4) When the area is searched and the salted items are not recovered the UXO sweep team will re-sweep the entire area.
- (5) The results and actions will be noted in the daily log.

Addendum A.

OEW Ordnance Accountability

Date: _____

1. Team _____

2. Site Supervisor _____

3. Team Members _____

4. Commenced sweep operations (time) _____

Meal Break _____ Coffee Break _____

5. Man Hours Utilized

UXO Pers. _____

Assist _____

Total _____

6. List Ordnance located _____

Other contacts _____

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April 10, 1993

**ENVIRONMENTAL HAZARDS SPECIALISTS
INTERNATIONAL, INC.**

**Health and Safety Plan
ARTHUR d. LITTLE, FORT DEVENS**

I. EHS has developed this Health and Safety Plan which contains emergency action procedures for implementation in the event of an accident, explosive or chemical incident, fire, or personnel injury during an EOD operation. EHS personnel are all trained and certified to render First Aid and will be on site during all work periods. A emergency vehicle, capable of transporting a litter-borne patient, will remain at the site under the control of the Site Supervisor. This vehicle will not be used during working hours except to respond to an accident on site or to transport a patient to the nearest medical treatment facility.

II. Medical Surveillance

All EHS employees are active participants in the medical surveillance program, having received base line and annual physical.

III. Safety Training

All EHS employees that participate in field activities have received extensive training and procedures both on active duty and while participating in projects for the COE, USATHAMA and civilian contractors. All EHS employees have received the basic 40 hour Health and Safety course, the 8 hour Supervisors course and annual refresher up-dates. All EHS personnel have received intensive training and have many hours of field experience in the specialized field activities such as the health and safety program, employee training program, personal protective equipment, spill containment procedures and health hazard monitoring procedures and techniques.

IV. Site Specific Safety Orientation Meeting

A site specific orientation meeting shall be conducted for all employees, including all contractor personnel prior to commencement of field activities. The following topics will be discussed at this meeting:

- a. * Names of all personnel responsible for field safety
- b. * Health and Safety organization
- c. * Expected Hazards at the site
- d. * Exposure Risk
- e. * Personal protective equipment
- f. * Personnel and equipment decon procedures
- g. * Air monitoring
- h. * Emergency procedures

V. Buddy System

a. The "buddy system" will be used during all field activities. At no time will an individual enter the exclusion zone and conduct any intrusive operations without another person present.

VI. Controlled Area

a. A controlled area is defined as the area which all entry and activities are monitored and regulated by the EHS Site Supervisor.

VII. Work Zones

a. Three work zones will be established around an intrusive activity: the exclusion zone, the contamination reduction zone (CRZ) and the support zone.

VIII. Warning System

a. EHS will have a warning systems for alerting all personnel to an emergency situation. All teams will be alerted via radio or hand signal. At the sound of the warning signal, all personnel will stop work, and await instructions by radio from the Site Supervisor, Command Post or Safety Officer.

IX. Responsibility

a. The Field or Site Supervisor / Safety Officer will designated as the EHS Emergency coordinator and will be responsible for implementing the appropriate emergency action procedures, needed to meet the identified emergency. The Site Supervisor / Safety Officer/Command Post will inform all supervisory personnel of the type and nature of the emergency and will direct emergency action. He will maintain all necessary forms and records required for on-the-job-related accidents and injuries. In addition, the following requirements are assigned:

- Field/Site Supervisor - In charge at the scene of the emergency. He will be responsible for supervision of all personnel at the scene. He will coordinate the emergency operation safely and efficiently, evaluate the program, and relay information to the Command Post.

- Team Leaders - Will maintain radio communications with all on site activity. He will be responsible for the emergency vehicle and ensure that it is available. He will respond to the site of the emergency, if required to provide medical support. They will direct the sweep team members and take precautionary steps to ensure an emergency situation does not escalate. They will assemble with their teams to support emergency operations as directed by the Safety Officer, and will initiate immediate emergency procedures until relieved by higher authority.

- Team Members - Will be responsible for ensuring that all emergency situations are reported immediately to their supervisors and the command post.

X. Procedures

Emergency action will be carried out for each type of emergency in accordance with the procedures briefly discussed in the following paragraphs.

XI. Fire Fighting

In the event of a fire, the following actions will be initiated by the key personnel:

1. • Report to 911 and request fire department support.
2. • Give exact location.
3. • If required, request assistance
4. • Initiate fire fighting efforts.
5. • Report fire to COR Safety.
6. • Brief the responding fire department as to hazards and conditions at the site of the fire.
7. All nonessential personnel will be withdrawn from the scene of the fire to a distance that has already been figured. When the question of safety is in doubt no effort will be made to fight the fire. All personnel and equipment shall withdraw from the danger area.
8. The Site Supervisor has direct responsibility for on-site fire fighting efforts. Upon notification of a fire, he will proceed to that location to direct all personnel and resources at the scene.

9. All fires will be fought immediately and without waiting for specific instructions. However, if the fire involves explosive materials or is so large that it cannot be extinguished with the equipment at hand, all personnel involved shall evacuate and muster at the parking area.

10. In the event of an evacuation, the Team Leader is responsible for ensuring that all assigned EOD technicians/field personnel are present before evacuation. The Safety Officer will be notified if all team members are/are not accounted for.

XII. Explosive/Chemical Incident

1. In the event of an explosive/chemical incident, all area operations will stop. A complete review of all events leading to the incident will be conducted to determine the cause and to determine if there was negligence, lack of supervision, or lack of training. Immediate corrective action will be implemented.

2. In the event of injury to personnel from an explosive/chemical mishap, the Site Supervisor/Team Member will notify the command post and:

- a. • Render immediate aid, State nature of injury.
- b. • Give exact location.
- c. • Request ambulance (if necessary) with the cellular phone.
- d. • Station personnel on the road to direct the Safety Officer and ambulance to the scene.

3. When the Safety Officer receives the emergency call, he will:

- a. • Get the specific details on the nature of the injury.
- b. • Determine exact location.
- c. • Notify EHS.
- d. • Respond to the scene with the required first-aid equipment.
- e. • Be prepared to transport the patient for emergency treatment.

4. The Site Supervisor, with the aid of the Team Members, will ensure that written reports are submitted by all concerned personnel, and other witnesses. These reports will be submitted not more than 48 hours after the incident.

XIII. Industrial Accident

Industrial Accidents include all mishaps not involving an unintentional explosion. Depending on the type and severity of the incident, work may or may not be stopped.

1. All industrial accidents will be recorded on the Daily First Aid Treatment Log and turned into the Safety Officer at the end of each day. A complete review of the event will be conducted to determine if there was negligence, lack of supervision, or lack of training. The Safety Officer shall submit a written report to the Project Leader with recommendations and corrective actions.

2. The Safety Officer will ensure that written reports are submitted by concerned personnel if the accident involves at time loss due to reduced numbers of personnel or equipment.

XIV. Medical Emergency

1. A medical emergency may develop as a result of unintentional explosion, industrial-related accident, or environmental influences (rough terrain, heat, etc.). In the event of any medical emergency, the Safety Officer will be notified immediately.

- a. • Get specific details on the nature of the injury.
- b. • Determine the exact location.
- c. • Notify EHS.
- d. • Respond to the scene as directed with the required first-aid equipment.
- e. • Await the medical team.

XV. Emergency Equipment

1. The following emergency equipment will be available at the work site:

- a. * First aid kit
- b. * Eye wash
- c. * Potable water
- d. * Gator aid or equivalent
- e. * Fire extinguisher ABC
- f. * shovels

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ADDENDUM

SURVEYING BORINGS AND MONITORING WELL LOCATIONS

1. The Environmental Hazards Specialists, Int. Inc (EHS) SOP, the client Health & Safety and Sampling Plans will be the guidelines for reference, the following will be the EOD procedures that will be followed to insure that the boring/monitoring wells located in a area suspected of having UXOs,CSM or other hazardous waste are surveyed in a correct and safe manner.
2. A static walk through will be done during the EHS mobilization period to get a baseline on the material being used and to familiarize all field personnel on the procedures to be used and answer any questions that may arise.
3. The following steps may not be all inclusive as situations will change at each work site, "ie" types and sizes of suspected ordnance, impact range, demolition range, demolition range with shots that were buried, but these steps will help the team get off on the right foot with the capability to adjust the procedure without compromising safety. Remove all magnetic materials.
4. Remove the MK 26 from its carrying case and using the MK 26 manual (if required) assemble the unit in the bore hole configuration. Insure all threaded connections are clean and all covers or plugs are in place, the assembly should be accomplished in a clean area not out in the field. Be sure that the batteries are up at a minimum to 95 % and the safety line is attached correctly.
5. During all downhole operations the correct size PVC will be on-site and immediately available, under no circumstances will the probe be lowered into the Monitoring Well/Boring/Hollow Stem Auger with out PVC. The following procedures will be followed when using the hollow stem auger.

WARNING

NEVER LOWER THE PROBE WITHOUT PVC INSTALLED

NEVER LOWER THE PROBE USING ONLY THE CONTROL WIRE

IF THE HOLLOW STEM AUGER CANNOT BE REMOVED HAVE AT LEAST 5' FROM THE CENTER OF THE PROBE TO THE BOTTOM OF THE AUGER

USE A MINIMUM OF TWO MEN TO CONDUCT THIS OPERATION

A. Survey the surface location as required by the SOP

A1. Survey depths will be dictated by the client

B. At 2' install the PVC till it bottoms out and record this depth, bring the auger to the surface move the drill rig a minimum of 20 feet, one technician will lower the probe using the safety line the other technician will watch the meter. If clear remove the probe and PVC and continue the drilling.

C. At 4' install the PVC till it bottoms out and record this depth bring the auger up and out and move the drill rig a minimum of 20 feet repeat the same procedures as in "B" if clear continue drilling.


D. At 6', 8 and 10' the same procedures will be followed, if the range has a history as described in para 3) of being used as a bombing range or a heavy impact range the above procedures will be used down to a minimum of 20'. (NOTE) There will be times when our last check will be at the 12 foot depth and even sooner, "ie" (undisturbed soil) this will be verified by the rig geologist and the EHS Supervisor.

E. There will be times that common sense will dictate some of the actions, "ie" normally the derrick can remain up, but if its on the side of a hill or uneven terrain it should be lowered, all situations are not exact, stop and address each condition as it arises, remember this is a team, utilize all the expertise available, if a contact is encountered notify the Site geologist and recommend moving the location.

F. If the ground is soft or on an incline some sort of track to get the drill rig repositioned will be required most installations have marshall matting around, a couple sections under the wheels will give the drill rig a temporary road bed for repositioning. If the site has heavy contamination a back hoe may have to be used to install a PVC stick up. You may have to explain this to the FOL.

NOTE: An Access and Egress route will be surveyed for all surface OEW, a 90 foot diameter working area will be surveyed at the Boring/Monitoring well location this may have to be larger if the drillers need some decon space, all attempts shall be made to put these work areas upwind. Pin flags will be used to show the areas that have been surveyed to work in.

NOTE: If using a hand augur the downhole procedures are to clear the surface, hand augur to 2 feet, clear to 4 feet.

Sincerely

Charles E. Wharton, Sr.
President

Health and Safety Plan: Fort Devens
Section No.: Appendix F
Revision No.: 1
Date: June 16, 1993

Appendix F: Fort Devens Safety Regulations

See Health and Safety Plan

Attachment A

Personnel Training and Physical Examination Record

See Health and Safety Plan

Attachment B

Site Health and Safety Plan Review Record

See Health and Safety Plan

Attachment C

Environmental Monitoring Record

See Health and Safety Plan

Attachment D

Daily Site Health and Safety Activity Report

See Health and Safety Plan

Attachment E

Fort Devens Examples of Contaminants On-Site

Site #	Compound	PEL/TLV	Routes of Exposure	Acute Symptoms	Odor Description
33, 34, 35, 36, 37	Malathion	10 mg/m ³	Inh, Abs, Ing, Con	Miosis, aching eyes, blurred vision, lac; eye, skin irrit; salv; anor, nau, vomit, abdom cramps, diarr, gidd, conf, ataxia; rhin, head; tight chest, wheez, lar spasm	Garlic-like
33, 34, 35, 36, 37	DDT	1 mg/m ³	Inh, Abs, Ing, Con	Pares tongue, lips, face; tremor; appre, dizz, conf, mal, head, ftg; convuls; paresis hands; vomit; irrit eyes, skin; [carc]	Slight aromatic
33, 34, 35, 36, 37	Kerosene (Fuel Oil)	--	Inh, Ing, Abs, Con	Respiratory irritation, vomiting, diarrhea	Oil
33, 34, 35, 36, 37	Round-up Herbicide (Glyphosate)	--	Inh, Dermal, Con	Gastrointestinal discomfort, nausea, vomit, diarrhea	Slight amine odor
17, 39	Explosives (TNT)	1.5 mg/m ³ 0.5 mg/m ³	Inh, Dermal	Jaundice, muscular pain, dermatitis	Resinous
29, 39	Petroleum Hydrocarbons (Stoddard Solvent)	100 ppm	Inh, Con, Ing	Irrit, eyes, nose, throat; dizz; derm	Kerosene-like odor
29, 39	Trichloro-benzene	5 ppm (Ceiling)	Inh, Con, Derm, Ing	Caughing, derm, gastrointestinal discomfort	Aromatic odor
10	Construction debris (Asbestos)	0.2-2 fiber/cc	Inh, Ing	Dysp, interstitial fib, restricted pulm function, finger clubbing [carc]	
16	General rubbish				

Attachment F

Accident Report form (DA Form 285)

See Health and Safety Plan

Attachment G
Resumes for Key Personnel

Background

Mr. Fortner is a hydrogeologist in the Earth Sciences and Engineering Unit at Arthur D. Little. His experience includes environmental project management and design, as well as practical execution and interpretation of numerous invasive and non-invasive sampling and exploratory techniques. Mr. Fortner is intimately familiar with application, limitations and execution of the following exploratory and sampling techniques: exploratory drilling (HSA, drive & wash, bedrock coring, and air & mud rotary), monitoring well installations, geophysical testing (GPR, EM-31, EM-34, VLF, electrical resistivity and seismic refraction), hydraulic surveys (in-situ permeability, 3-D gradient, and aquifer stress tests), soil sampling (split-spoon, thin wall and hand auger), ground water sampling, surface water and sediment sampling, lagoon and sump sampling, and effluent/outfall sampling. Mr. Fortner has the required 40 hour OSHA training course for hazardous waste site activities, and some representative projects which demonstrate Mr. Fortner's experience are as follows:

Professional Experience

Deputy Project Manager/Project Hydrogeologist/Field Manager/On-site Health and Safety Officer acting on behalf of the U.S. EPA under the Region 1 ARCS contract, for a \$1.25M Phase 1A RI/FS of the Fletcher's Paint Superfund site in Milford, New Hampshire. Responsibilities included development of an EPA approved Work Plan and Field Operations Plan, project scheduling and staffing, subcontractor procurement, daily communications with ADL and EPA Project Managers, data management and evaluation, report preparation, and Phase 1B Work Plan development. Phase 1A field activities included mobilization, field reconnaissance, seismic refraction surveys, VLF surveys, GPR surveys, exploratory boring and ground water monitoring well installations, surface water and sediment sampling, building sampling, catch basin and outfall sampling, and hydraulic analyses. Stringent QA/QC programs were maintained and approximately 50% of the field work was performed in Level C PPE.

Project Manager for an environmental site assessment at a manufacturing plant in Brighton, Massachusetts. Mr. Fortner was responsible for the implementation of the remedial investigation and coordinating communications with both the client and state and federal agencies. The investigation included the identification and removal of multiple contaminant sources and the delineation of subsequent contaminant plumes including a 15-foot thick, free-floating product plume. Twenty-two multi-level ground water monitoring wells were installed for chemical sampling and hydraulic testing. The program resulted in the acquisition and evaluation of qualitative data needed to design an effective, cost efficient, and successful remediation system.

Jeffrey W. Fortner (Continued)

Field Manager and On-site Health and Safety Officer acting on behalf of the U.S. EPA under the ARCS (Region 1) contract, for a \$350k Phase 1A RI/FS at the Picillo Farm Superfund Site in Coventry, Rhode Island. Responsibilities included subcontractor selection; day-to-day management of extensive, simultaneous field activities including site clearance and access logistics; monitoring well development and sampling activities; a seismic refraction and very low frequency (VLF) surveys; a magnetometer survey; a soil gas survey; a location and elevation survey; residential well sampling activities; and the completion of weekly status reports to the Project Manager. Additionally, Mr. Fortner assisted in both the completion of the Phase 1A Work Plan, Field Operations Plan, and Final Report, and the development of the Phase 1B work plan.

Team Leader for numerous pre-acquisition/pre-divestiture assessment involving a variety of commercial and industrial activities including operations in the petroleum, electronics, plastics/rubber, waste handling, transportation, foundry, and chemical industries. Responsibilities typically include project scheduling and coordination, staffing, management of on-site activities, and report preparation.

Field Coordinator and Lead Sampler for several Federal RCRA and State Regulatory permit status assessments. Responsibilities included the design and execution of sampling programs for lagoon and outfall characterizations, comparison of results with applicable and/or proposed regulatory limits, and the development and prioritization of corrective actions as needed.

Primary author and designer of Arthur D. Little, Inc. Geotechnical Standard Operating Procedures (SOPs) and Field Forms.

International experience including work/travel in Canada, France, Japan, Malaysia, Singapore, Spain, and Taiwan.

Education

B.S., Geology, University of Delaware, 1987

Professional Affiliations

Registered Geologist, Tennessee, #TN0543
Member, National Groundwater Association

Background

Mr. Heuberger is a consultant in the Earth Sciences and Engineering Unit at Arthur D. Little, Inc. He has 10 years of experience in implementing, managing, and overseeing site investigations for private sector and public sector clients, both within New England and throughout the United States. He specializes in ground water contamination studies, hazardous waste site characterization, and remedial investigation. Mr. Heuberger has also recently performed assessments of the environmental monitoring and restoration programs at four DOE facilities, including the Pittsburgh Energy Technology Center in Pennsylvania, the Los Alamos National Laboratory in New Mexico, the Oak Ridge National Laboratory in Tennessee, and the Ames Laboratory in Iowa. Mr. Heuberger is a certified professional geologist.

Professional Experience

Mr. Heuberger acts as a ground water and CERCLA specialist for DOE Tiger Team assessments of environmental protection and restoration programs at the Pittsburgh Energy Technology Center, Pittsburgh, Pennsylvania; Los Alamos National Laboratory, Los Alamos, New Mexico; Oak Ridge National Laboratory, Oak Ridge, Tennessee; and Ames Laboratory, Ames, Iowa.

He was the manager and principal author of a remedial investigation/feasibility study for the Savage Municipal Well Site in Milford, New Hampshire.

Under the Massachusetts Department of Environmental Protection (DEP) Site Assessment and Remedial Support Services (SARSS) contract, Mr. Heuberger was a project manager in charge of three sites.

Mr. Heuberger has also been the project manager of hazardous waste site assessments and hydrogeological investigations for numerous industrial and commercial properties in southern New England.

Mr. Heuberger has supervised the geotechnical and environmental evaluation of proposed sites for the construction of dams, tailing ponds, and waste storage areas associated with mine development in northern California.

Mr. Heuberger developed and implemented exploratory field programs involving geologic mapping, integration of aerial photography and satellite imagery, chemical sampling and analysis, geophysical surveys, and drilling programs at a variety of locations in Nevada.

Mark O. Heuberger (Continued)

Prior to working for Arthur D. Little, Mr. Heuberger managed numerous hazardous waste site assessments and remedial investigations for a variety of public and private sector clients. Among these work assignments was a remedial investigation and feasibility study that he managed for a National Priority List (NPL) site in southern New Hampshire.

While working as a geologist with Chevron Resources Company, Mr. Heuberger conducted exploratory sampling, geologic mapping, geophysical surveys, and drilling programs in Virginia, North Carolina, and Georgia.

As a geologist for Mauricio Hochschild y Compañía, Ltda. in Lima, Peru, he performed geologic mapping and geochemical sampling of the Andes of southern Peru.

Education

M.S., Geology, University of Nevada-Reno, 1985

B.S., Earth Sciences, Dartmouth College, 1981

Professional Affiliations

Certified Professional Geologist, American Institute of Professional Geologists

Member, Association of Ground Water Scientists and Engineers

Member, National Water Well Association



U.S. Army
Environmental
Center

Final

**Health and Safety Plan
Supplement B**

**Base Realignment and Closure
Environmental Evaluation
Fort Devens, Massachusetts**

Submitted to

**U.S. Army Environmental
Center (USAEC)
Aberdeen Proving Ground, Maryland**

**Revision 2
May 6, 1994**

**Arthur D. Little, Inc.
Acorn Park
Cambridge, Massachusetts
02140-2390**

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1.0 Introduction

See Health and Safety Plan.

2.0 Staff, Organization, and Responsibilities

2.1 Project Staff and Health and Safety Organization

The personnel and their organizations listed below will be performing various onsite and/or offsite activities (see Figure 2-1B). The USAEC Project Manager will be notified promptly of any potential onsite health and safety problems and changes in the health and safety organization. Telephone numbers are provided in Section 7.8.8 of this plan.

2.1.1 USAEC

- Project Manager: Charles George
- Health and Safety Officer: William P. Houser

2.1.2 Fort Devens

- Health and Safety Officer: Richard Theobald

2.1.3 Arthur D. Little, Inc.

- Program Manager: Robert Lambe
- Task Manager: Richard Waterman
- Deputy Task Manager: Anthony Parkin
- Health and Safety Staff:
 - Corporate Director of Health and Safety (CDHS): R.S. Stricoff, CIH, CSP
 - Project Field Supervisor: Anthony Parkin
 - Health and Safety Officer (HSO): Corey Briggs, CIH CET
 - Health and Safety Officer, Alternate: Peter Roy, CIH
 - Site Health and Safety Officer (SHSO): Anthony Parkin
 - Site Health and Safety Officer, Alternates: To be determined
 - Task Health and Safety Officer (THSO): To be determined in the field

2.2 Responsibilities

2.2.1 Task Manager/Deputy Task Manager

See Health and Safety Plan

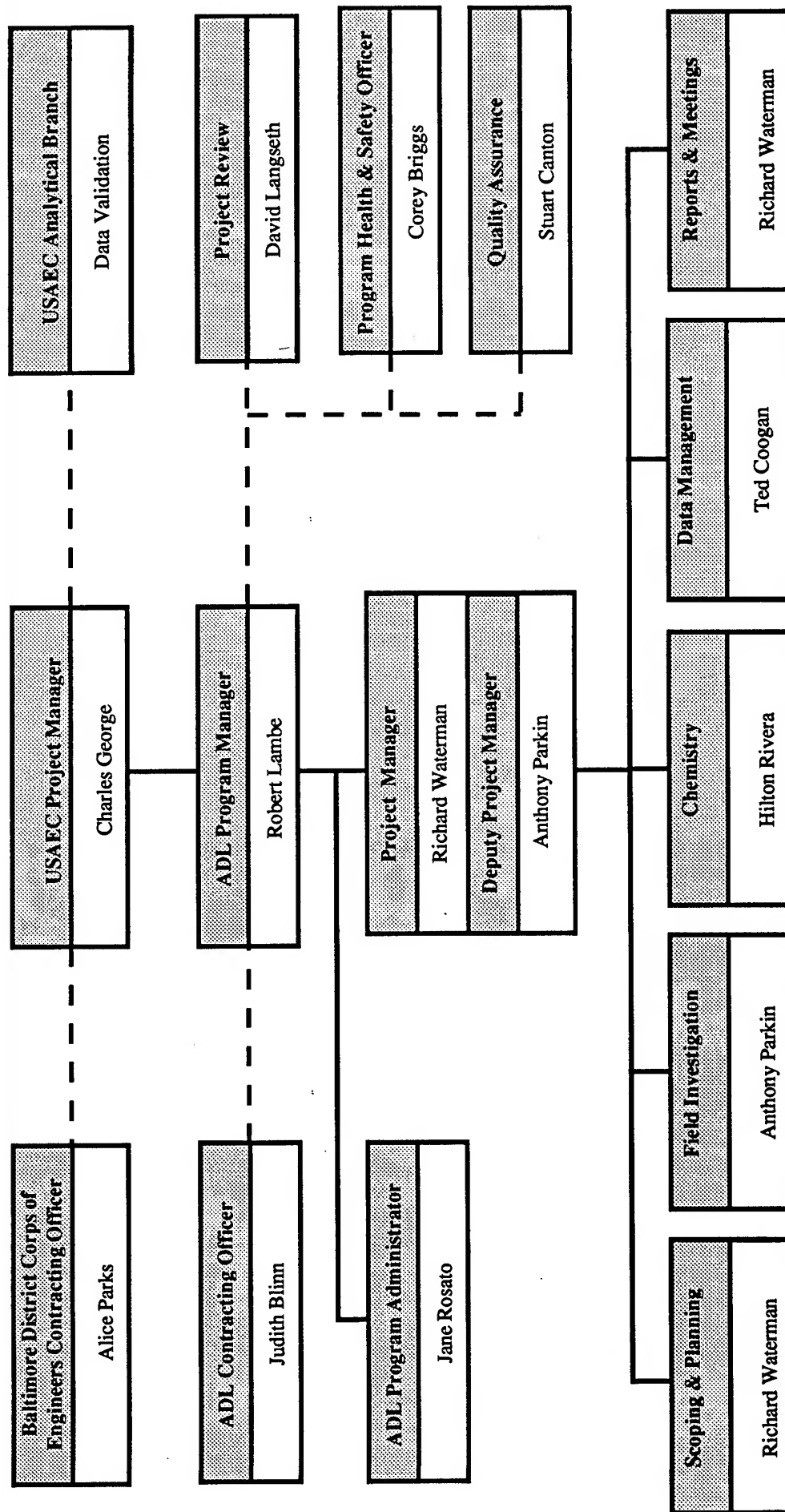
2.2.2 Project Field Supervisor

See Health and Safety Plan

2.2.3 Corporate Director of Health and Safety (CDHS)

See Health and Safety Plan

Figure 2-1B
Fort Devens Environmental Evaluation - Organizational Chart



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2.2.4 Health and Safety Staff (HSO and Alternate HSO)

See Health and Safety Plan

2.2.5 Site Health and Safety Officer (SHSO)

See Health and Safety Plan

2.2.6 Site Health and Safety Officer - Alternates(s)

See Health and Safety Plan

2.2.7 Task Health and Safety Officer

See Health and Safety Plan

2.2.8 Field Geologists, Sampling Technicians, Chemists, and Field Personnel

See Health and Safety Plan

2.2.9 Subcontract Personnel

See Health and Safety Plan

3.0 Hazard Communication and Training

3.1 Health and Safety Training

See Health and Safety Plan

3.2 Health and Safety Site Orientation

See Health and Safety Plan

3.3 Site Documentation

See Health and Safety Plan

3.4 Health and Safety Briefings

See Health and Safety Plan

3.5 Post-Investigation Health and Safety Briefing

See Health and Safety Plan

3.6 Subcontractor Personnel

See Health and Safety Plan

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4.0 Medical Surveillance and Exposure Monitoring

4.1 Medical Surveillance

See Health and Safety Plan

4.2 Exposure Monitoring

See Health and Safety Plan

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5.0 Health and Safety Equipment

5.1 Personal Protective Equipment

5.1.1 General

See Health and Safety Plan

5.1.2 Respiratory Protection

See Health and Safety Plan

5.1.3 Maintenance and In-use Inspection of Protective Equipment

See Health and Safety Plan

5.2 Environmental Monitoring Equipment

5.2.1 General

See Health and Safety Plan

5.2.2 Real Time Air Monitoring

See Health and Safety Plan

5.2.3 Perimeter Monitoring

See Health and Safety Plan

5.2.4 Flammable/Combustible Gases

See Health and Safety Plan

5.2.5 Oxygen Deficiency

See Health and Safety Plan

5.2.6 Respirable Dust

See Health and Safety Plan

5.2.7 Calibration and Maintenance

See Health and Safety Plan

5.2.8 Recordkeeping Requirements

See Health and Safety Plan

5.2.9 Heat Stress

See Health and Safety Plan

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5.2.10 Cold Stress

See Health and Safety Plan

5.2.11 Action Levels

See Health and Safety Plan

5.2.11.1 Chemical Vapors. See Health and Safety Plan

5.2.11.2 Explosive Limit Detection. See Health and Safety Plan

5.2.11.3 Oxygen Deficiency. See Health and Safety Plan

5.2.11.4 Radiation Detection. See Health and Safety Plan

5.3 Emergency Equipment

See Health and Safety Plan

6.0 Background, Site Location, and Site Description

6.1 Background

See Health and Safety Plan

6.2 Site Location and Description

See Health and Safety Plan

6.3 Site-specific Actions

6.3.1 BRAC EE Investigations

The BRAC EE addresses four site-wide Areas Requiring Environmental Evaluation (AREE):

- Maintenance and Waste Accumulation Areas (MWAAs);
- Transformers;
- Past Spill Sites; and
- Previously Removed Underground Storage Tanks.

All four AREE's are located throughout the North and Main Posts of Fort Devens. The site specific Health and Safety Plans in Appendix D contain detailed information on the site specific activities (e.g., site evaluation, soil sampling) to be conducted at each area.

6.3.2 BRAC EE Supplemental Investigations

6.3.2.1 BRAC EE Maintenance and Waste Accumulation Areas (AREE 61). The primary objectives of the AREE 61 Maintenance and Waste Accumulation Areas (MWAAs) field investigation are:

- To conduct site investigations at 30 maintenance and waste accumulation areas at Fort Devens to assess the presence of contamination due to unremediated or partially remediated spills or releases of hazardous materials. Three of the 30 MWAAs will be assessed under ongoing Fort Devens Field Investigations. These three sites include 61G, 61I, and 61BG. 61G is included in the SA-43Q Supplemental SI Data Package. 61I is included in the Supplemental SI Data Package (SA43H and 43I) and the Fort Devens UST Management Program 61BG is included in the Fort Devens Installation Solid Waste Disposal Site Closure Assessment.

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- To evaluate the data to determine which sites require further sampling, or require inclusion in a CERCLA study under the IAG process; and/or are candidates for removal action.

The AREE 61 site investigations will be conducted at 29 areas of the Main Post of Fort Devens. These sites were identified in the *Maintenance and Waste Accumulation Areas Report - AREE 61, BRAC EE, Fort Devens, Massachusetts (USAEC)*. This work is being conducted as part of the ongoing Base Realignment and Closure Environmental Evaluation (BRAC EE) at Fort Devens. This investigation has been divided into Phase I and II with 17 sites included in Phase I and 9 sites in Phase II.

6.3.2.2 BRAC EE Previously Removed USTs (AREE 63). The supplemental investigations for AREE 63 addresses sites at Fort Devens which require further action for underground storage tanks that had been removed from the base between 1988 and 1992. Only underground storage tanks removed from the Main and North Posts of the installation were evaluated in this study. A total of 53 previously removed underground storage tank sites were studied under this delivery order. From this study it was determined that 7 require further investigation.

The purpose of this investigation is to evaluate the potential for existing contamination at each of the tank removal locations that require further action. The AREE 63 Memorandum Work Plan dated February 17, 1994 includes discussions of historical data organized by tank removal contractor and then by associated building and tank number. Each site targeted for further investigation is discussed individually and recommendations for further action are provided on a tank-by-tank basis.

6.3.2.3 BRAC EE Transformers - Verbeck Gate Substation (AREE 66). The Verbeck Gate substation is located to the northwest of Verbeck Gate on West Main Street Ayer, Massachusetts. This substation is one of the major substations supplying electrical power to Fort Devens. The substation is under the direct control of Fort Devens personnel and is maintained by the installation. Arthur D. Little under contract to the U.S. Army Environmental Center (USAEC contract DAAA15-91-D-0016/0005) investigated historical leaks from equipment containing PCBs. A sampling program was conducted in the summer of 1993 of soils around equipment that either historically or currently contained PCBs which were suspected of leaking to soil. Verbeck Gate Substation was not included in the Sampling Program as part of that study. The current investigation addresses sampling recommended to identify potential PCB spills within the substation.

A total of 41 samples will be taken at Verbeck substation. The samples will be taken in a grid pattern throughout the substation. An increased sampling density will be focused around the transformers and rectifiers where the majority of spills are located. Sample locations will target visual evidence of spills.

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6.3.2.4 BRAC EE Past Spill Sites (AREE 69). The primary objectives of the AREE 69 Past Spill Site Study at Fort Devens are:

- To conduct Past Spill Site investigations at 10 areas of Fort Devens to assess the presence of contamination due to unremediated or partially remediated spills of hazardous materials.
- To evaluate the data to determine which sites require further sampling, require inclusion in a CERCLA study under the IAG process; and are candidates for removal action.

The AREE 69 Past Spill Site Study will be conducted at 10 areas of the Main Post and North Post (Moore Army Airfield) BRAC EE of Fort Devens. These sites were identified in the *Draft Past Spill Site Report - AREE 69, BRAC EE, Fort Devens, Massachusetts (USAEC)*.

The AREE 69 Work Plan dated February 17, 1994 sets forth the background, plans, and rationale for the activities to be completed during the AREE 69 Past Spill Site Study. The Plan also presents objectives, rationale, frequency, and locations for all sampling occurring in this field investigation.

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Table 6-1B: List of Maintenance and Waste Accumulation Areas Requiring Further Action

AREE No.	Associated AREE/SA	Building/ Location	Summary of Findings
61A	SA,33,34, 35	Near T-242, 262	Motor pool; no longer in use.
61B	NA	3773/3774	Building 3774 motor pool; in use - rebuilt. Two oil/water separators connected to sanitary sewer. Building 3773 and 3774 have satellite accumulation points for HW.
61E	NA	P-1401	Motor pool; in use - rebuilt. One oil/water separator with discharge to storm drain; HWAA and satellite HW accumulation points.
61F	43C	T-3549	Motor pool; in use.
61H	NA	616 to 618	Building 616 motor pool; in use - rebuilt. Two oil/water separators connected to sanitary sewer; HWAA and satellite accumulation points for HW.
61I	43H and I	601 to 605	Motor pool; in use - rebuilt. One oil/water separator connected to sanitary sewer; HWAA and satellite accumulation points for HW.
61J	NA	612 to 614	Motor pool; in use - rebuilt. One oil/water separator connected to sanitary sewer; HWAA and satellite accumulation for HW.
61K	37	3622	Motor pool; no longer in use.
61L	NA	Across from cemetery	This is a grassy knoll with no historical motor pool. Deleted from study.
61M	37	3606	Motor pool; no longer in use.
61N	NA	T-36705	Motor pool; no longer in use.
61O	43K	2517	Motor pool; in use - rebuilt. One oil/water separator with undetermined outlet. One oil/water separator at carwash facility connected to sanitary sewer.
61P	43L	T-2601	Motor pool; no longer in use.
61Q	43M	2613	Motor pool; no longer in use.
61R	43N, 45	Between 2613 and 2680	Motor pool; no longer in use. One oil/water separator connected to sanitary sewer.
61S	43O	2680	Motor pool; no longer in use.

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Table 6-1B: List of Maintenance and Waste Accumulation Areas Requiring Further Action (continued)

AREE No.	Associated AREE/SA	Building/ Location	Summary of Findings
61U	43Q	Across Street 694	Motor pool; no longer in use.
61V	43S	3412	Motor pool; no longer in use.
61W	49, 37	3601	Motor pool; no longer in use.
61X	38,44,52,57	3713	Three oil/water separators connected to sanitary sewer; HWAA and satellite accumulation points for HW. Only building will be studied.
61Y	NA	3813/3816/3818	Two oil/water separators connected to sanitary sewer; Satellite accumulation points for HW.
61Z	48	202	One oil/water separator connected to sanitary sewer.
61AB	NA	219	Satellite accumulation point for HW. One oil/water separator connected to sanitary sewer.
61AI	NA	3587	HWAA and satellite accumulation points for HW.
61AQ	43B	Across from T-3545	Former gas station.
61AR	43D	P-171	Former gas station.
61AS	43E	P-172/2020	Former gas station.
61AT	43R	P-186/696	Former gas station.
61AU	57	3749-3758	Motor pool; in use.
61BD	NA	B-216	Contractors' yard at DRMO.

Notes: NA = Not applicable
 HW = Hazardous waste
 HWAA = Hazardous waste accumulation area for less than 90-day accumulation

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Table 6-2B: List of Previously Removed Underground Storage Tanks Requiring Further Investigation

AREE	Building #	Size/Contents
63Q	2626	1,000 gal. #2 Fuel Oil
63Y	2659	1,000 gal. #2 Fuel Oil
63AG	2606	1,000 gal. #2 Fuel Oil
63AI	2618	1,000 gal. #2 Fuel Oil
63AJ	2619	1,000 gal. #2 Fuel Oil
63AX	2517	1,000 gal. Waste Oil

Table 6-3B: Past Spill Sites Requiring Further Action

AREA	Location	Previously Identified SA No.	Date	Chemical	Amount	Report	Status	Remarks
69A	Building 3606- Ramp 3651	NA	3/27/91	Waste Oil	UNK	UNK	Soil has been removed and is awaiting disposal. No known report to MDEP.	
69B	Building 2602	NA	10/30/90	No. 2 Fuel Oil	UNK	Notice	Notice of responsibility sent 11/2/91. No recorded follow-up or cleanup.	
69AE	MAAF-Bldg. 3809	NA	4/9/89	JP-4 Fuel	70 gal.	UNK	Dennis England, OSC, DEH notified. Cleanup complete 4/11/89.	Area was excavated.
69K	Lake George Street	NA	7/3/90	Diesel	20-30 gal.	MDEP	Notice of responsibility given. No record of follow-up.	Cleanup begun 8/15/90 by Maaci Construction.
69AD	Building 203	48	2/9/89	Oil	UNK	MDEP	Unknown as to whether soil has been treated. No record of follow-up to MDEP.	Deleted from this study, covered in SI
69W	FD Elementary School	NA	2/26/74	No. 4 Fuel Oil	400 gal.	UNK	UNK	
69AC	Building 1004	NA	10/30/80	No. 4 Fuel Oil	10-15 gal.	DEH notified	UNK	
69AL	North of DRMO Yard	NA	11/05/87	Diesel Fuel	25-50 gal.	EMO DEH	UNK	
69AV	Building 655	NA	02/16/82	UNK	10-15 gal.	UNK	UNK	
69AF	Pine Street	NA	09/12/85	Waste Oil	UNK	DEH	UNK	

UNK = Unknown

NA = Not Applicable

PCB = Polychlorinated Biphenyls

MDEP = Massachusetts Department of Environmental Protection

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Table 6-4B: Transformer Location to be Sampled

AREE No.	Associated AREE/SA	Building Location	Remarks
66	NA	Verbeck Substation	Reports of past oil leaks from the transformers and switch boxes at this substation

7.0 Health and Safety Procedures

7.1 Site-Specific Health and Safety Plan

See Health and Safety Plan

7.2 Work Zones and Site Control

See Health and Safety Plan

7.2.1 Work Zones

See Health and Safety Plan

7.2.2 Exclusion Zones

See Health and Safety Plan

7.2.3 Contamination Reduction/Decontamination Zones

See Health and Safety Plan

7.2.4 Support Zone

See Health and Safety Plan

7.2.5 Site Entry and Exit

See Health and Safety Plan

7.2.6 Site Access and Parking

See Health and Safety Plan

7.2.7 Buddy System

See Health and Safety Plan

7.3 Environmental Monitoring

See Health and Safety Plan

7.4 Safe Work Practices

7.4.1 General

See Health and Safety Plan

7.4.2 Daily Start-up and Shutdown Procedures

See Health and Safety Plan

7.4.3 Confined Space Entry

See Health and Safety Plan

The stormwater discharge survey aspect of this project may require the entry into confined spaces such as manholes, sumps, pits, etc.

7.4.4 Tanks, Drums, and Barrels

See Health and Safety Plan

7.4.5 Accident Prevention Plan

See Health and Safety Plan

7.5 Site Entry Procedures

See Health and Safety Plan

7.6 Decontamination

7.6.1 Exclusion and Decontamination Zones

See Health and Safety Plan

Although they have been oriented to the risks and hazards of confined spaces, Arthur D. Little personnel are prohibited from conducting entry into confined spaces during this project. Confined entry by Arthur D. Little personnel will be determined by the Task Manager, the Program Manager, and the HSO that a large percentage of spaces will require entry in order to conduct sampling activities. For the storm sewer survey we estimate a small number of confined space entries will be required. We will retain the services of a qualified contractor to conduct confined space sampling operations.

7.6.2 Decontamination Procedures

See Health and Safety Plan

7.6.2.1 Partial Decontamination. See Health and Safety Plan

7.6.2.2 Complete Decontamination. See Health and Safety Plan

7.6.3 Decontamination Notice to Emergency Personnel

See Health and Safety Plan

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7.6.4 Equipment Decontamination

See Health and Safety Plan

7.6.5 Disposal of Wastes During Investigative Activities

See Health and Safety Plan

7.7 Communications and Equipment

See Health and Safety Plan

7.8 Emergency Action Plan

See Health and Safety Plan

7.8.1 Pre-Emergency Planning

See Health and Safety Plan

7.8.2 Emergency Recognition and Prevention

See Health and Safety Plan

7.8.3 Emergency Equipment

See Health and Safety Plan

7.8.4 Operations Shutdown

See Health and Safety Plan

7.8.5 Fire and Explosion Response Procedures

See Health and Safety Plan

7.8.6 Spills, Releases, Leaks of Hazardous Materials

See Health and Safety Plan

7.8.7 Evacuation from Work Zones

See Health and Safety Plan

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7.8.8 Emergency Telephone Numbers

See Health and Safety Plan

Other Important Numbers

See Health and Safety Plan

Arthur D. Little, Inc.
(617) 498-5000 (Main Number)
Richard Waterman (Task Manager) x5562
Corey Briggs, CIH (HSO) x6106
Peter Roy, CIH (AHSO) x6112
Chris Martel, CHP (RSO-Radiation) x6103
R.S. Stricoff, CIH, CSP (CHSO) x5884

7.8.8.1: Site-Specific Directions to Cutler Army Hospital. Due to the large number and location of study areas associated with this task, site-specific directions to the Cutler Army Hospital are not specifically included in this plan. However, provisions will be made at the beginning of each day to ensure that personnel are completely familiar with the location of their work area with respect to Cutler Army Hospital. Other emergency response procedures and communication arrangements will be discussed with all personnel as part of the daily safety meeting.

7.8.9 Reporting Incidents

7.8.9.1 Large-Scale Incidents. See Health and Safety Plan

7.8.9.2 Accidents, Injuries, Illnesses. See Health and Safety Plan

7.9 First Aid Emergency Procedures

7.9.1 Chemical Exposures

See Health and Safety Plan

8.0 Site Hazard Summary

See Health and Safety Plan

8.1 Unexploded Ordnance (UXO)

See Health and Safety Plan

8.2 Chemical and Radioactive Hazards

See Health and Safety Plan

8.3 Physical Hazards

See Health and Safety Plan

8.3.1 Abatement of Physical Hazards

See Health and Safety Plan

8.3.2 Fire/Explosion

See Health and Safety Plan

8.3.3 Buried Utility Lines

See Health and Safety Plan

8.3.4 Drilling

See Health and Safety Plan

8.3.5 Sampling

See Health and Safety Plan

8.3.6 Excavation Safety

See Health and Safety Plan

8.3.7 Aquatic Activities

See Health and Safety Plan

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8.4 Environmental Hazards

8.4.1 General

See Health and Safety Plan

8.4.2 Insect/Pest Hazards

See Health and Safety Plan

8.4.3 Heat Stress Hazards

See Health and Safety Plan

8.4.4 Cold Stress Hazards

See Health and Safety Plan

8.5 Initial and Continued Site Evaluation

See Health and Safety Plan

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Appendix A: Health and Safety Training Requirements

See Health and Safety Plan

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Appendix B: Medical Monitoring Requirements

See Health and Safety Plan

Appendix C: Accident Prevention Plan

1.0 Responsibilities

See Health and Safety Plan

2.0 Training

See Health and Safety Plan

3.0 General Safety Precautions

See Health and Safety Plan

4.0 Sanitation

See Health and Safety Plan

5.0 Fire Prevention

See Health and Safety Plan

6.0 Housekeeping

See Health and Safety Plan

7.0 Individual Protective Equipment

See Health and Safety Plan

8.0 Tools

See Health and Safety Plan

9.0 Powered Equipment

See Health and Safety Plan

10.0 Hazardous and Toxic Materials

See Health and Safety Plan

11.0 Emergencies

See Health and Safety Plan

12.0 Accident Reporting, Analysis and Prevention

See Health and Safety Plan

13.0 Site Safety Inspections

See Health and Safety Plan

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Appendix D: Site-Specific Health and Safety Plans

**Task-Specific
Health and Safety Plan
Arthur D. Little, Inc.**

This plan is applicable for sites where the work involves uncharacterized chemical contamination. Please reference the Arthur D. Little Hazardous Waste Operation Health and Safety Program Plan for detail on the overall program. A copy of the most current Arthur D. Little Health and Safety Program Plan for Hazardous Waste Site Operations (April, 1992) and the Fort Devens Health and Safety Plan shall be available at the site in addition to other applicable documentation.

Job Name Fort Devens Assessment **Case No.** 67065

Site Location Various general assessment activities

Site History Various historical gas stations, motor pools, hazardous waste storage

Site Description/Nature of Work Assessment of potential areas contamination

Dig Safe and Other Utilities Notified N/A

By Whom N/A **Date** N/A

Response N/A

File Numbers N/A

Primary Level of Protection: Level D during general site assessment activities (e.g., site tours, document review, interviews, etc.) Follow base policy for general PPE (e.g., safety glasses, hard hats, etc.) during tours.

Contingency Level of Protection: Work will not involve direct contact with hazardous substances.

Emergency Phone Numbers

ADL Health and Safety Office: Primary - 800-677-3000 x6106 (C. Briggs), Alternate 800-677-3000 x6112 (P.Roy), Alternate 800-677-3000 x5884 (S. Stricoff)

Ambulance: 796-6911 **Fire:** 796-2220 **Police:** 796-3333

Hospital:Name Cutler Army HospitalAddress Building 3654 - Fort AveryHospital Phone Number 796-6911

Attach written directions and a map of the route to the nearest hospital
(Attachment 1)

Other: Nashoba Community HospitalPhone No. 772-2657Environmental/H&S Bill MullenPhone No. 796-3114Location of Nearest Phone: Varies (Mobil phone); Two way radio**Site Hazards****Chemical Hazards (overview, include source and location of contaminants):**

During general assessment activities there is not anticipated contact with hazardous substances. Tours may involve walking through garages, motor pools etc., which could have oils, greases, etc.

Representative Chemicals**PEL/TLV/IDLH**N/AN/A**Factors Indicating the Nature of the Potential or Known Contaminants at the Site:**Site History: ☒ Previous Sampling Results: _____ Current Use: ☒

Explain: Oils, greases, PCB's; Environmental assessment is also to identify other sources of on site contamination.

Major Routes of Exposure: Several from inadvertent contact.Symptoms of Exposure/Potential Health Effects: N/A**Physical Hazards**

If drilling, the general types of hazards associated with a drill rig are present, namely, slips and falls, falling objects, hand, foot and back injuries, etc. If digging test pits, the additional hazards of a swinging backhole bucket, collapse of excavation, etc., exist.

Noise Hazards

The noise associated with operation of a drill rig or other heavy equipment can cause permanent, irreversible hearing loss. "Impact noise," such as that caused by driving a well point or split spoon with a drill rig hammer, is especially damaging. Proper hearing protection (ear muffs or plugs) must be worn when near a source of loud noise.

Fire Hazards: No fire hazards are expected other than from base-related incidents from day-to-day operations.

Electrical Hazards: Live electrical circuits in buildings, power cords, exposed circuit boxes and wires.

Oxygen Deficiency: Not anticipated.

Confined Space Entry: Not applicable, ADL prohibited from this type of work. No entry allowed into pits, trenches, vaults, manholes, sumps, etc.

Radioactive Materials: Not anticipated, but a general screening to be conducted.

Other Hazards: Heat stress, Cold stress, environmental hazards, slip, trips, falls, vehicle operations (seat belts mandatory)

Personnel Health and Safety Requirements

Medical Monitoring Requirements. Site personnel must be participants in ADL's, or similar, medical monitoring program, and must have had their most recent exam within the previous 12 months. The exam must have indicated no medical restrictions that would inhibit personnel from performing the required work tasks.

Training Requirements. All site personnel must have the current 40 hours or 8 hours (refresher) of relevant health and safety training and/or experience which included coverage of hazard recognition, use of site monitoring instruments, use of personal protective equipment, etc. Personnel must also be oriented to the components of this site-specific plan. Attachment A shall be utilized to document training and physical examination records of site personnel. Attachment B shall be used to document orientation to this site-specific plan.

Site Health and Safety Procedures

Procedures for a Site "Walk-Over":

Practice contamination avoidance at all times, do not step in areas of obvious contamination; do not move or jostle unlabeled or unknown containers; do not kneel on the ground, floor or other potentially contaminated surfaces; wear appropriate safety equipment consistent with base policy.

Procedures for Intrusive Site Work: (Drilling, Test Pits, etc.)

A. Personal Protective Equipment:

1. (a) PPE should be used on the site. (See the PPE Checklist attached to this plan; Attachment 2).

(b) Type of Respirator Cartridges: N/A

2. Additional Personal Protective Equipment: N/A

B. Monitoring Equipment: Not anticipated for this activity.

C. Additional Safety Equipment: N/A

D. Health and Safety Work Procedures:

1. Site Briefings: Conduct a daily briefing with site personnel and go over work objectives and the major elements of this plan.

- Tailgate Safety Meeting Form
- In Field Notebook

2. Site Control: Not anticipated for this activity.

3. Activity Specific Procedures:

- (a) Task(s): General site assessment; facility tour; site visits; interviews; document reviews, etc.

Procedures: Follow "Site Walkover" procedures on page 5. Do not conduct work beyond the scope of this activity (e.g., intrusive sampling, etc.)

Action Levels: Standard: 19.5%-0₂; 10% of LEL; PID-Bkgd=D Not other LOP anticipated based on task activities.

3. (b) Task(s): N/A

Procedures: N/A

Action Levels: N/A

3. (c) Task(s): N/A

Procedures: N/A

Action Levels: N/A

3. (d) Task(s): N/A

Procedures: N/A

Action Levels: N/A

4. Personnel and Equipment Decontamination: **NOTE: N/A for this activity**

- Remove gross contamination from tools, respirator, monitoring equipment, boots, etc. prior to leaving the work-site, using water, paper towels, handi-wipes, etc.
- Either completely decontaminate soiled equipment at the work-site using detergent and water (if possible), or wrap equipment in plastic bag for transport until complete decontamination is possible.
- Always follow established personal decontamination procedures and remove contaminated gloves, Tyvek suits, used cartridges, paper towels, etc. by placing in a plastic bag and arrange for proper disposal.
- Wash hands and face thoroughly with soap and water before lunch or coffee breaks, and as soon as practicable after finishing work for the day.
- Additional Decontamination: Decontamination not anticipated for this task activity. Practice contamination avoidance at all times.

Emergency Procedures

Personal Injury. If authorized, administer appropriate first aid. The injured may need to be transported to the nearest hospital. If possible, notify hospital in advance of incoming patient and nature of injury. If there is a question about whether it is safe to move the victim, DO NOT move the victim - instead, make him/her as comfortable as possible, and summon emergency assistance.

Chemical Exposure. If site personnel show signs of inhalation exposure, retreat to fresh air for recovery. If symptoms warrant, bring the injured to the nearest hospital for observation, and discontinue work at that location and consult with H&S representative.

In case of skin or eye irritation due to chemical contact, wash affected skin with soap and water, or flush eyes with generous amount of water. If irritation is serious, seek medical attention.

Fire. If the fire can be easily contained and extinguished, do so with a portable fire extinguisher. If explosion risk is present, do not attempt to extinguish - evacuate all personnel to a safe area and call the fire department (796-2220).

Spills. If safe to do so, contain the spill if materials and equipment are available. If these materials are not available or the release is beyond the capabilities of site personnel, contact local emergency responders who are trained and equipped to control and cleanup the release (796-2220).

Important Note: If site observations, sampling results, or any other information indicates the presence of chemical contaminants other than those specified herein, this health and safety plan becomes void, and a new plan must be prepared and approved!

The field logbook or Attachment D to the Health and Safety Program Plan shall be completed to document daily health and safety activities in the study areas.

Project Manager _____

Health & Safety Plan Prepared By _____ **Date** _____

Health & Safety Plan Approved By _____ **Date** _____

Arthur D. Little, Inc. PPE Checklist

- _____ 1. MSA Ultratwin full-face air-purifying respirator, in a protective plastic bag
- _____ 2. Nose cup insert for MSA Ultratwin respirator
- _____ 3. Ear-muff set which fits into hardhat
- _____ 4. Optional: Eyeglass kit for MSA Ultratwin respirator
- _____ 5. MSA cartridges for respirator OV/AG/HEPA (GMC-H)
- _____ 6. Protective lenses cover for MSA Ultratwin respirator
- _____ 7. Disposable ear plugs
- _____ 8. Silvershield gloves
- _____ 9. Natural rubber gloves
- _____ 10. Nitrile gloves
- _____ 11. Polyethylene Tyvek suit
- _____ 12. Saranex Tyvek suit
- ☒ _____ 13. Safety glasses with side shields
- _____ 14. Goggles
- _____ 15. Plastic disposal bags
- ☒ _____ 16. Hardhat
- _____ 17. Duct tape
- _____ 18. Other (list below)
- _____ 19. Steel toe/Steel Shank Boots
 - _____ Regular _____ Chemically Resistant
 - _____ Close toe work shoes
 - _____
 - _____

**Task-Specific
Health and Safety Plan
Arthur D. Little, Inc.**

This plan is applicable for sites where the work involves uncharacterized chemical contamination. Please reference the Arthur D. Little Hazardous Waste Operation Health and Safety Program Plan for detail on the overall program. A copy of the most current Arthur D. Little Health and Safety Program Plan for Hazardous Waste Site Operations (April, 1992) and the Fort Devens Health and Safety Plan shall be available at the site in addition to other applicable documentation.

Job Name Fort Devens Assessment **Case No.** 67065

Site Location Various Surface Soil Sampling Activities

Site History Historical PCB transformer locations

Site Description/Nature of Work Fort Devens Main Post various locations surficial soil sampling

Dig Safe and Other Utilities Notified N/A

By Whom N/A **Date** N/A

Response N/A

File Numbers N/A

Primary Level of Protection: D⁺ during surface soil sampling for PCBs

Contingency Level of Protection: _____

Emergency Phone Numbers

ADL Health and Safety Office: Primary 800-677-3000 x6106 (C. Briggs), Alternate 800-677-3000 x6112 (P. Roy), Alternate 800-677-3000 (S. Stricoff)

Ambulance: 796-6911 **Fire:** 796-2220 **Police:** 796-3333

Hospital:

Name Cutler Army Hospital

Address Building 3654 - Fort Devens

Hospital Phone Number 796-6911

Attach written directions and a map of the route to the nearest hospital (Attachment 1)

Other: Nashoba Community Hospital Phone No. 772-2657

Environmental/H&S Bill Mullen Phone No. 796-3114

Location of Nearest Phone: Varies (Mobil Phone; Two way radio)

Site Hazards

Chemical Hazards (overview, include source and location of contaminants):

PCB (polychlorinated biphenyl) contamination is being assessed via collection of soil samples near transformers.

Representative Chemicals	PEL/TLV/IDLH
<u>Polychlorinated Biphenyls</u>	<u>0.5 or 1 mg/m³ 8hr TWA(54% or 42%)</u>
<u>as Chlorobiphenyls</u>	<u></u>
<u>Carrier solvent (e.g. chlorobenzene)</u>	<u>75 ppm 8hr TWA</u>
<u></u>	<u></u>

Factors Indicating the Nature of the Potential or Known Contaminants at the Site:

Site History: ✓ Previous Sampling Results: Current Use: ✓

Explain: Potential leakage from PCB transformers in use, shipping, storage areas.

Major Routes of Exposure: Several primarily; inhalation if dusting occurs or solvent vapors noticeable; ingestion if good hygiene not practiced; eye exposure from dust generation or accidental contact; potential infection from cuts caused by sharp objects.

Symptoms of Exposure/Potential Health Effects: Skin rash PCBs not normally detected by direct reading instruments (may pick up carrier solvent). Upgrade a level Protection when in doubt.

Physical Hazards

If drilling, the general types of hazards associated with a drill rig are present, namely, slips and falls, falling objects, hand, foot and back injuries, etc. If digging test pits, the additional hazards of a swinging backhole bucket, collapse of excavation, etc., exist.

Noise Hazards

The noise associated with operation of a drill rig or other heavy equipment can cause permanent, irreversible hearing loss. "Impact noise," such as that caused by driving a well point or split spoon with a drill rig hammer, is especially damaging. Proper hearing protection (ear muffs or plugs) must be work when near a source of loud noise.

Fire Hazards: Solvents used for decontamination of sampling equipment and supplies.

Electrical Hazards: Live electrical circuitry in buildings; overhead lines; potential exposed circuit boxes and wires; wire/lines underground on/around poles and pad areas; HIGH VOLTAGE.

Oxygen Deficiency: Not anticipated

Confined Space Entry: Not applicable; ADL personnel prohibited.

Radioactive Materials: Not anticipated but a general screening to be conducted.

Other Hazards: Heat stress, Cold stress, environmental hazards, slips, trips, falls; vehicle operation (seat belts mandatory); traffic from base operations.

Personnel Health and Safety Requirements

Medical Monitoring Requirements. Site personnel must be participants in ADL's, or similar, medical monitoring program, and must have had their most recent exam within the previous 12 months. The exam must have indicated no medical restrictions that would inhibit personnel from performing the required work tasks.

Training Requirements. All site personnel must have the current 40 hours or 8 hours (refresher) of relevant health and safety training and/or experience which included coverage of hazard recognition, use of site monitoring instruments, use of personal protective equipment, etc. Personnel must also be oriented to the components of this site-specific plan. Attachment A shall be utilized to document training and physical examination records of site personnel. Attachment B shall be used to document orientation to this site-specific plan.

Site Health and Safety Procedures

Procedures for a Site "Walk-Over":

Practice contamination avoidance at all times; do not step in areas of obvious contamination; do not move or jostle unlabelled or unknown containers; do not kneel on the ground or floor or other potentially contaminated surfaces; wear Level D⁺ to minimize skin contact.

Procedures for Intrusive Site Work: (Soil Sampling, Drilling, Test Pits, etc.)

A. Personal Protective Equipment:

1. (a) PPE should be used on the site. (See the PPE Checklist attached to this plan; Attachment 2).

(b) Type of Respirator Cartridges: Organic vapor/acid gas/HEPA (GMC-H)

2. Additional Personal Protective Equipment: N/A

B. Monitoring Equipment: HN_u or Microtrip; combustible gas/oxygen meter; Draeger colormetric tubes, the feed log, both or attachment C shall be used to document onsite environmental monitoring.

C. Additional Safety Equipment: Safety vests if sampling in roadways.

D. Health and Safety Work Procedures:

1. Site Briefings: Conduct a daily briefing with site personnel and go over work objectives and the major elements of this plan.

- Tailgate Safety Meeting Form
- In Field Notebook

2. Site Control: Control work areas using contamination barricade tape, road cones, sawhorses, etc., to prohibit the entry of unauthorized personnel; use the buddy system.

3. Activity Specific Procedures:

- (a) Task(s): Surface soil sampling around areas of suspect PCB contamination.

Procedures: Put on protective equipment (e.g. white tyvek, two pair of gloves, protective eyewear, boots, etc.) use good sampling techniques; practice contamination avoidance, don't kneel on contaminated surface (use mat, board, etc.) if odors are noted, upgrade to Level C and conduct all monitoring.

Action Levels: 19.5%-O₂; 10% of LEL; PID-Bkgd=D⁺; PID +BKGD to 5 ppm for 5 minutes = C; PID>5ppm for 5 minutes or peak of 30ppm or greater - atep operations; RAD>2 mR/hr=stop work, leave area.

3. (b) Task(s): Sample handling and packaging

Procedures: Put on protective equipment; use care in handling preservatives

Action Levels: N/A

3. (c) Task(s): N/A

Procedures: N/A

Action Levels: N/A

3. (d) Task(s): N/A

Procedures: N/A

Action Levels: N/A

4. Personnel and Equipment Decontamination:

- Remove gross contamination from tools, respirator, monitoring equipment, boots, etc. prior to leaving the work-site, using water, paper towels, handi-wipes, etc.
- Either completely decontaminate soiled equipment at the work-site using detergent and water (if possible), or wrap equipment in plastic bag for transport until complete decontamination is possible.
- Always follow established personal decontamination procedures and remove contaminated gloves, Tyvek suits, used cartridges, paper towels, etc. by placing in a plastic bag and arrange for proper disposal.
- Wash hands and face thoroughly with soap and water before lunch or coffee breaks, and as soon as practicable after finishing work for the day.
- Additional Decontamination: Properly dispose of equipment, PPE which is suspected of being contaminated.

Emergency Procedures

Personal Injury. If authorized, administer appropriate first aid. The injured may need to be transported to the nearest hospital. If possible, notify hospital in advance of incoming patient and nature of injury. If there is a question about whether it is safe to move the victim, DO NOT move the victim - instead, make him/her as comfortable as possible, and summon emergency assistance.

Chemical Exposure. If site personnel show signs of inhalation exposure, retreat to fresh air for recovery. If symptoms warrant, bring the injured to the nearest hospital for observation, and discontinue work at that location and consult with H&S representative.

In case of skin or eye irritation due to chemical contact, wash affected skin with soap and water, or flush eyes with generous amount of water. If irritation is serious, seek medical attention.

Fire. If the fire can be easily contained and extinguished, do so with a portable fire extinguisher. If explosion risk is present, do not attempt to extinguish - evacuate all personnel to a safe area and call the fire department (796-2220).

Spills. If safe to do so, contain the spill if materials and equipment are available. If these materials are not available or the release is beyond the capabilities of site personnel, contact local emergency responders who are trained and equipped to control and cleanup the release (796-2220).

Important Note: If site observations, sampling results, or any other information indicates the presence of chemical contaminants other than those specified herein, this health and safety plan becomes void, and a new plan must be prepared and approved!

The field logbook or Attachment D shall be completed to document daily health and safety activities in the study areas.

Project Manager _____

Health & Safety Plan Prepared By _____ **Date** _____

Health & Safety Plan Approved By _____ **Date** _____

Arthur D. Little, Inc. PPE Checklist

- ☒ 1. MSA Ultratwin full-face air-purifying respirator, in a protective plastic bag
- ☒ 2. Nose cup insert for MSA Ultratwin respirator
- ☐ 3. Ear-muff set which fits into hardhat
- ☒ 4. Optional: Eyeglass kit for MSA Ultratwin respirator
- ☒ 5. MSA cartridges for respirator OV/AG/HEPA (GMC-H)
- ☒ 6. Protective lenses cover for MSA Ultratwin respirator
- ☐ 7. Disposable ear plugs
- ☒ 8. Silvershield gloves
- ☒ 9. Natural rubber gloves
- ☒ 10. Nitrile gloves
- ☐ 11. Polyethylene Tyvek suit
- ☐ 12. Saranex Tyvek suit
- ☒ 13. Safety glasses with side shields
- ☐ 14. Goggles
- ☒ 15. Plastic disposal bags
- ☒ 16. Hardhat
- ☒ 17. Duct tape
- ☐ 18. Other (list below)
- ☐ 19. Steel Toe/Steel shank boots
 - ☒ Regular ☒ Chemically Resistant
- White Tyvek Suit
- Reflective Road Vests

Attachment E

Fort Devens Examples of Contaminants On-Site

Compound	PEL/TLV	Routes of Exposure	Acute Symptoms	Odor Description
Kerosene (Fuel Oil)	--	Inh, Ing, Abs, Con	Respiratory irritation, vomiting, diarrhea	Oil
Petroleum Hydrocarbons (Stoddard Solvent)	100 ppm	Inh, Con, Ing	Irrit, eyes, nose, throat; dizz; derm	Kerosene-like odor
Polychlorinated Biphenyls (PCBs)	0.5 mg/m ³	Inh, Abs, Ing. Con	Irrit, eyes, nose, throat; dizz; derm	Mild hydrocarbon

**Site-Specific
Health and Safety Plan
Arthur D. Little, Inc.**

This plan is applicable for sites where the work involves unknown or uncharacterized chemical contamination. Please reference the Arthur D. Little Hazardous Waste Operation Health and Safety Program Plan for detail on the overall program. A copy of the most current Arthur D. Little Health and Safety Program Plan for Hazardous Waste Site Operations (April, 1992) and the Fort Devens Main Post Health and Safety Plan shall be available at the site in addition to other applicable documentation.

Job Name Storm Sewer Study **Case No.** 67065

Site Location Nashua River, Willow Brook, Cold Spring Brook

Site History A study of the portions of the Nashua River, Willow Brook and Cold Spring Brook, will be conducted to evaluate the potential environmental impacts to the waterbodies from storm sewer outfalls.

Site Description/Nature of Work The scope of work for this study will include: records review and the collection of one surface water and sediment samples along the river channel.

Dig Safe and Other Utilities Notified N/A

By Whom N/A **Date** N/A

Response N/A

File Numbers N/A

Primary Level of Protection: Level D+

Contingency Level of Protection: N/A

Emergency Phone Numbers

ADL Health and Safety Office: Primary 800-677-3000 x6106 (C. Briggs), Alternate 800-677-3000 x6112 (P. Roy), Alternate 800-677-3000 x5884 (S. Stricoff)

Ambulance: 769-6911 **Fire:** 796-2220 **Police:** 796-3333

Hospital:

Name Culter Army Hospital

Address Building 3654 - Fort Devens

Hospital Phone Number 796-6911

Attach written directions and a map of the route to the nearest hospital (Attachment 1)

Other: Nashoba Community Hospital **Phone No.** 772-2657

Environmental/H&S Safety Rep - Rick Theobald **Phone No.** 796-3114

Location of Nearest Phone: _____

Site Hazards

Chemical Hazards (overview, include source and location of contaminants):

Unknown at this point in time. Assuming low concentrations which would not present a hazard to personnel.

Representative Chemicals	PEL/TLV/IDLH
<u>N/A</u>	<u>N/A</u>

Factors Indicating the Nature of the Potential or Known Contaminants at the Site:

Site History: ☒ **Previous Sampling Results:** _____ **Current Use:** _____

Explain: _____

Major Routes of Exposure: Dermal primary; ingestion if good hygiene not practiced; potential eye exposure from splashing; potential injection from cuts caused by sharp objects.

Symptoms of Exposure/Potential Health Effects: None presently noted.

Physical Hazards

If drilling, the general types of hazards associated with a drill rig are present, namely, slips and falls, falling objects, hand, foot and back injuries, etc. If digging test pits, the additional hazards of a swinging backhole bucket, collapse of excavation, etc., exist.

Noise Hazards

The noise associated with operation of a drill rig or other heavy equipment can cause permanent, irreversible hearing loss. "Impact noise," such as that caused by driving a well point or split spoon with a drill rig hammer, is especially damaging. Proper hearing protection (ear muffs or plugs) must be worn when near a source of loud noise.

Fire Hazards: N/A

Electrical Hazards: N/A

Oxygen Deficiency: N/A

Confined Space Entry: Waterborne activities.

Radioactive Materials: N/A

Other Hazards: Heat stress, cold stress, environmental hazards (e.g., ticks, insects, etc.).

Personnel Health and Safety Requirements

Medical Monitoring Requirements. Site personnel must be participants in ADL's, or similar, medical monitoring program, and must have had their most recent exam within the previous 12 months. The exam must have indicated no medical restrictions that would inhibit personnel from performing the required work tasks.

Training Requirements. All site personnel must have the current 40 hours or 8 hours (refresher) of relevant health and safety training and/or experience which included coverage of hazard recognition, use of site monitoring instruments, use of personal protective equipment, etc. Personnel must also be oriented to the components of this site-specific plan. Attachment A shall be utilized to document training and physical examination records of site personnel. Attachment B shall be used to document orientation to this site-specific plan.

Site Health and Safety Procedures

Procedures for a Site "Walk-Over":

Practice contamination avoidance at all times; do not step in areas of obvious contamination; do not move unlabelled or unknown containers; do not kneel on ground, floor or other potentially contaminated surfaces; all efforts must be made to minimize contaminating clean work areas; wear proper personal protective equipment.

Procedures for Intrusive Site Work: (Drilling, Test Pits, etc.)

A. Personal Protective Equipment:

1. (a) PPE should be used on the site. (See the PPE Checklist attached to this plan; Attachment 2).

(b) Type of Respirator Cartridges: N/A

2. Additional Personal Protective Equipment:

B. *Monitoring Equipment:* N/A

C. *Additional Safety Equipment:* USCG-approved PFD for boat activities; PFD with rubber chest waders for non-boat activities.

D. *Health and Safety Work Procedures:*

1. Site Briefings: Conduct a daily briefing with site personnel and go over work objectives and the major elements of this plan.

- Tailgate Safety Meeting Form
- In Field Notebook

2. Site Control: Not practical due to movement down river. Buddy system imperative.

3. Activity Specific Procedures:

(a) Task(s): Collect surface water and sediment samples.

Procedures: Don protective equipment (e.g., coated Tyvek, chest waders, PFD, gloves, etc.). Be extra careful conducting waterborne activities. Do not wear waders when in the boat. Use good sampling procedures; watch out for uneven surfaces.

Action Levels: N/A

3. (b) Task(s): Install staff gauges.

Procedures: Don proper protective equipment (e.g., safety glasses, leather/canvas gloves, boots); watch out for physical hazards, slips, trips, falls, etc.

Action Levels: N/A

Other tasks (if applicable) are attached.

4. Personnel and Equipment Decontamination:

- Remove gross contamination from tools, respirator, monitoring equipment, boots, etc. prior to leaving the work-site, using water, paper towels, handi-wipes, etc.
- Either completely decontaminate soiled equipment at the work-site using detergent and water (if possible), or wrap equipment in plastic bag for transport until complete decontamination is possible.
- Always follow established personal decontamination procedures and remove contaminated gloves, Tyvek suits, used cartridges, paper towels, etc. by placing in a plastic bag and arrange for proper disposal.

- Wash hands and face thoroughly with soap and water before lunch or coffee breaks, and as soon as practicable after finishing work for the day.
- Additional Decontamination: Follow decontamination procedures in the program plan if more extensive decontamination is needed.

Emergency Procedures

Personal Injury. If authorized, administer appropriate first aid. The injured may need to be transported to the nearest hospital. If possible, notify hospital in advance of incoming patient and nature of injury. If there is a question about whether it is safe to move the victim, DO NOT move the victim - instead, make him/her as comfortable as possible, and summon emergency assistance.

Chemical Exposure. If site personnel show signs of inhalation exposure, retreat to fresh air for recovery. If symptoms warrant, bring the injured to the nearest hospital for observation, and discontinue work at that location and consult with H&S representative.

In case of skin or eye irritation due to chemical contact, wash affected skin with soap and water, or flush eyes with generous amount of water. If irritation is serious, seek medical attention.

Fire. If the fire can be easily contained and extinguished, do so with a portable fire extinguisher. If explosion risk is present, do not attempt to extinguish - evacuate all personnel to a safe area and call the fire department (796-2220).

Spills. If safe to do so, contain the spill if materials and equipment are available. If these materials are not available or the release is beyond the capabilities of site personnel, contact local emergency responders who are trained and equipped to control and cleanup the release (796-2220).

Important Note: If site observations, sampling results, or any other information indicates the presence of chemical contaminants other than those specified herein, this health and safety plan becomes void, and a new plan must be prepared and approved!

The field logbook or Attachment D shall be **completed** to document daily health and safety activities in the study areas.

Project Manager _____

Health & Safety Plan Prepared By _____ Date _____

Health & Safety Plan Approved By _____ Date _____

Arthur D. Little, Inc. PPE Checklist

- ☐ 1. MSA Ultratwin full-face air-purifying respirator, in a protective plastic bag
- ☐ 2. Nose cup insert for MSA Ultratwin respirator
- ☐ 3. Ear-muff set which fits into hardhat
- ☐ 4. Optional: Eyeglass kit for MSA Ultratwin respirator
- ☐ 5. MSA cartridges for respirator OV/AG/HEPA (GMC-H)
- ☐ 6. Protective lenses cover for MSA Ultratwin respirator
- ☐ 7. Disposable ear plugs
- ☒ 8. Silvershield gloves
- ☐ 9. Natural rubber gloves
- ☒ 10. Nitrile gloves
- ☒ 11. Polyethylene Tyvek suit
- ☐ 12. Saranex Tyvek suit
- ☒ 13. Safety glasses with side shields
- ☒ 14. Goggles
- ☒ 15. Plastic disposal bags
- ☐ 16. Hardhat
- ☒ 17. Duct tape
- ☒ 18. Other (list below)
 - USCG-PFD; rubber chest waders.
 - Polyethylene Tyvek for 3a. only.
 - Standard work clothes or coveralls for other activities.

**Site-Specific
Health and Safety Plan
Arthur D. Little, Inc.**

This plan is applicable for sites where the work involves unknown or uncharacterized chemical contamination. Please reference the Arthur D. Little Hazardous Waste Operation Health and Safety Program Plan for detail on the overall program. A copy of the most current Arthur D. Little Health and Safety Program Plan for Hazardous Waste Site Operations (April, 1992) and the Fort Devens Main Post Health and Safety Plan shall be available at the site in addition to other applicable documentation.

Job Name Fort Devens Storm Sewer Study **Case No.** 67065

Site Location Various locations at Fort Devens Main Post and North Post

Site History Storm sewers on Fort Devens drain various industrial operations. The sewers may have conveyed contaminants to surface waters.

Site Description/Nature of Work The scope of work for this study includes: records review, verifying the routes of storm sewers, and sampling both internal points and system outfalls. Both sediment and surface water samples will be taken.

Dig Safe and Other Utilities Notified Notify base utilities as needed.

By Whom N/A **Date** N/A

Response N/A

File Numbers N/A

Primary Level of Protection: LOP will depend on atmospheric testing of confined space. Level B protection may be needed.

Contingency Level of Protection: Level B will be the highest LOP used. Level A not anticipated or practical.

Emergency Phone Numbers

ADL Health and Safety Office: Primary 800-677-3000 x6106 (C. Briggs), Alternate 800-677-3000 x6112 (P. Roy), Alternate 800-677-3000 x5884 (S. Stricoff)

Ambulance: 796-6911 **Fire:** 796-2220 **Police:** 796-3333

Hospital:Name Cutler Army HospitalAddress Building 3654 - Fort DevensHospital Phone Number 796-6911Other: Nashoba Community HospitalPhone No. 772-2657

Phone No. _____

Location of Nearest Phone: Will vary based on location of work.**Site Hazards****Chemical Hazards (overview, include source and location of contaminants):**Unknown at present. For purposes of confined space entry one may monitor for oxygen, combustible/flammable gases, hydrogen sulfide, carbon monoxide, methane, etc.**Representative Chemicals****PEL/TLV/IDLH**Unknown at present.**Factors Indicating the Nature of the Potential or Known Contaminants at the Site:**Site History: ☒ Previous Sampling Results: _____ Current Use: _____Explain: Investigation is to determine the level of hazardous constituents in stormwater system. Confined spaces present unique hazards above and beyond what may be in sediments, etc.**Major Routes of Exposure:** All routes (e.g., respiratory, skin absorption, etc.)**Symptoms of Exposure/Potential Health Effects:** Unknown, aside from potential effects of low oxygen content, and high concentrations of combustible gas, hydrogen sulfide, carbon monoxide, etc.**Physical Hazards**

Care must be exercised to reduce/eliminate hazards associated with the removal and lifting of manhole covers and other related closures. Watch out for slips, trips, and falls. Use safe lifting practices at all times. Use mechanical devices for lifting wherever possible. Use established hand signals if a forklift or other piece of machinery is being used for lifting (only one person shall give signals). Steel toe/steel shank work boots are required, as well as heavy leather/canvas gloves during the removal and movement of covers.

Noise Hazards

The noise associated with operation of a drill rig or other heavy equipment can cause permanent, irreversible hearing loss. "Impact noise," such as that caused by driving a well point or split spoon with a drill rig hammer, is especially damaging. Proper hearing protection (ear muffs or plugs) must be worn when near a source of loud noise.

Fire Hazards: Potential for combustible gases in confined spaces will warrant continuous monitoring - 10% of LEL is action limit. Use of decontamination solvents (e.g., hexane).

Electrical Hazards: Possible electrical cable in confined spaces (e.g., utilities).

Oxygen Deficiency: Possibly encountered in confined spaces. Continuous monitoring will be needed - <19.5% oxygen warrants upgrade to Level B.

Confined Space Entry: May be needed with areas which can't be sampled remotely. All provisions of 29 CFR 1910.146 must be met for safe entry.

Radioactive Materials: Not anticipated to be an issue due to site history. RSO available to support monitoring, if needed.

Other Hazards: PID to be utilized as a headspace monitor once any manhole is removed. Personnel are not to break plane of confined space with face.

Personnel Health and Safety Requirements

Medical Monitoring Requirements. Site personnel must be participants in ADL's, or similar, medical monitoring program, and must have had their most recent exam within the previous 12 months. The exam must have indicated no medical restrictions that would inhibit personnel from performing the required work tasks.

Training Requirements. All site personnel must have the current 40 hours or 8 hours (refresher) of relevant health and safety training and/or experience which included coverage of hazard recognition, use of site monitoring instruments, use of personal protective equipment, etc. Personnel must also be oriented to the components of this site-specific plan. Attachment A shall be utilized to document training and physical examination records of site personnel. Attachment B shall be used to document orientation to this site-specific plan.

Site Health and Safety Procedures

Procedures for a Sampling of Stormwater Systems:

Use remote sampling wherever possible; take PID reading of headspace of confined spaces. Practice contamination avoidance at all times; do not step in areas of obvious contamination; do not kneel on ground or other potential contaminated surfaces. Entry into confined spaces prohibited unless all requirements of 29 CFR 1910.146 are followed.

A. Personal Protective Equipment:

1. (a) PPE should be used on the site. (See the PPE Checklist attached to this plan; Attachment 2).

(b) Type of Respirator Cartridges: N/A

2. Additional Personal Protective Equipment:

Hard hats Safety glasses with sideshields

Work clothing Steel toe-steel shank work boots

B. Monitoring Equipment: PID for headspace monitoring

C. Additional Safety Equipment: N/A

D. Health and Safety Work Procedures:

1. Site Briefings: Conduct a daily briefing with site personnel and go over work objectives and the major elements of this plan.

- Tailgate Safety Meeting Form
- In Field Notebook

2. Site Control: Control work areas as best as possible with road cones etc. to prohibit entry of unauthorized personnel.

3. Activity Specific Procedures:

(a) Task(s): Confined space entry into stormwater systems.

Procedures: In accordance with 29 CFR 1910.146. Continuous air monitoring must be performed.

Action Levels: Level D to Level B dependent on results of continuous air monitoring. O_2 <19.5, LEL >10%, others contaminant specific.

4. Personnel and Equipment Decontamination:

- Remove gross contamination from tools, respirator, monitoring equipment, boots, etc. prior to leaving the work-site, using water, paper towels, handi-wipes, etc.
- Either completely decontaminate soiled equipment at the work-site using detergent and water (if possible), or wrap equipment in plastic bag for transport until complete decontamination is possible.
- Always follow established personal decontamination procedures and remove contaminated gloves, Tyvek suits, used cartridges, paper towels, etc. by placing in a plastic bag and arrange for proper disposal.
- Wash hands and face thoroughly with soap and water before lunch or coffee breaks, and as soon as practicable after finishing work for the day.

Emergency Procedures

Personal Injury. If authorized, administer appropriate first aid. The injured may need to be transported to the nearest hospital. If possible, notify hospital in advance of incoming patient and nature of injury. If there is a question about whether it is safe to move the victim, DO NOT move the victim - instead, make him/her as comfortable as possible, and summon emergency assistance.

Chemical Exposure. If site personnel show signs of inhalation exposure, retreat to fresh air for recovery. If symptoms warrant, bring the injured to the nearest hospital for observation, and discontinue work at that location and consult with H&S representative.

In case of skin or eye irritation due to chemical contact, wash affected skin with soap and water, or flush eyes with generous amount of water. If irritation is serious, seek medical attention.

Fire. If the fire can be easily contained and extinguished, do so with a portable fire extinguisher. If explosion risk is present, do not attempt to extinguish - evacuate all personnel to a safe area and call the fire department (796-2220).

Spills. If safe to do so, contain the spill if materials and equipment are available. If these materials are not available or the release is beyond the capabilities of site personnel, contact local emergency responders who are trained and equipped to control and cleanup the release (796-2220).

Important Note: If site observations, sampling results, or any other information indicates the presence of chemical contaminants other than those specified herein, this health and safety plan becomes void, and a new plan must be prepared and approved!

The field logbook or Attachment D shall be completed to document daily health and safety activities in the study areas.

Project Manager _____

Health & Safety Plan Prepared By _____ **Date** _____

Health & Safety Plan Approved By _____ **Date** _____

Arthur D. Little, Inc. PPE Checklist

- ☐ 1. MSA Ultratwin full-face air-purifying respirator, in a protective plastic bag
- ☐ 2. Nose cup insert for MSA Ultratwin respirator
- ☐ 3. Ear-muff set which fits into hardhat
- ☐ 4. Optional: Eyeglass kit for MSA Ultratwin respirator
- ☐ 5. MSA cartridges for respirator _____
- ☐ 6. Protective lenses cover for MSA Ultratwin respirator
- ☐ 7. Disposable ear plugs
- ☐ 8. Silvershield gloves
- ☐ 9. Natural rubber gloves
- ☒ 10. Nitrile gloves
- ☐ 11. Polyethylene Tyvek suit
- ☐ 12. Saranex Tyvek suit
- ☒ 13. Safety glasses with side shields
- ☐ 14. Goggles
- ☐ 15. Plastic disposal bags
- ☒ 16. Hardhat
- ☐ 17. Duct tape
- ☐ 18. Other (list below)
 - Work gloves (cotton, leather, canvas)
 - Steel toe, steel shank work boots
 - Work clothing, coveralls

**Site-Specific
Health and Safety Plan
Arthur D. Little, Inc.**

This plan is applicable for sites where the work involves unknown or uncharacterized chemical contamination. Please reference the Arthur D. Little Hazardous Waste Operation Health and Safety Program Plan for detail on the overall program. A copy of the most current Arthur D. Little Health and Safety Program Plan for Hazardous Waste Site Operations (April, 1992) and the Fort Devens Main Post Health and Safety Plan shall be available at the site in addition to other applicable documentation.

Job Name Fort Devens AREE Site Investigation **Case No.** 67065

Site Location Various locations throughout the Main and North Posts at Ft. Devens.

Site History The areas of investigation were selected based upon the potential historical contaminant release from: transformers, USTs, maintenance waste accumulation areas, and past spill sites.

Site Description/Nature of Work The work will include geophysical surveys, installation of ground water monitoring wells, collection of soil and ground water samples, field screening samples in a field laboratory, and surveying.

Dig Safe and Other Utilities Notified _____

By Whom _____ **Date** _____

Response _____

File Numbers _____

Primary Level of Protection: Level D

Contingency Level of Protection: Level C (if action levels are reached)

Emergency Phone Numbers

ADL Health and Safety Office: Primary 800-677-3000 x6106 (C. Briggs), Alternate 800-677-3000 x6112 (P. Roy), Alternate 800-677-3000 x5884 (S. Stricoff)

Ambulance: 769-6911 **Fire:** 796-2220 **Police:** 796-3333

Hospital:

Name Nashoba Community Hospital

Address 200 Groton Road

Hospital Phone Number 772-2657

Fire Hazards: Not anticipated

Electrical Hazards: Overhead power lines and underground power lines

Oxygen Deficiency: Not anticipated

Confined Space Entry: Not applicable; ADL prohibited from this type of work

Radioactive Materials: Not anticipated

Other Hazards: Heat stress, cold stress, environmental hazards (e.g., ticks, insects, etc.).

Personnel Health and Safety Requirements

Medical Monitoring Requirements. Site personnel must be participants in ADL's, or similar, medical monitoring program, and must have had their most recent exam within the previous 12 months. The exam must have indicated no medical restrictions that would inhibit personnel from performing the required work tasks.

Training Requirements. All site personnel must have the current 40 hours or 8 hours (refresher) of relevant health and safety training and/or experience which included coverage of hazard recognition, use of site monitoring instruments, use of personal protective equipment, etc. Personnel must also be oriented to the components of this site-specific plan. Attachment A shall be utilized to document training and physical examination records of site personnel. Attachment B shall be used to document orientation to this site-specific plan.

Site Health and Safety Procedures

Procedures for a Site "Walk-Over":

Practice contamination avoidance at all times; do not step in areas of obvious contamination; do not move unlabelled or unknown containers; do not kneel on the ground, floor or other potentially contaminated surfaces; all efforts must be made to minimize contaminating clean work areas; wear proper personal protective equipment.

Procedures for Intrusive Site Work: (Drilling, Test Pits, etc.)

A. Personal Protective Equipment:

1. (a) PPE should be used on the site. (See the PPE Checklist attached to this plan; Attachment 2).

(b) Type of Respirator Cartridges: Organic vapor/acid gas/HEPA (GMC-H)

2. Additional Personal Protective Equipment: HNu or microtip; combustible gas/oxygen meter. The field log book or Attachment C shall be used to

document onsite environmental monitoring.

B. *Monitoring Equipment:* N/A

C. *Additional Safety Equipment:* _____

D. *Health and Safety Work Procedures:*

1. Site Briefings: Conduct a daily briefing with site personnel and go over work objectives and the major elements of this plan.

- Tailgate Safety Meeting Form
- In Field Notebook

2. Site Control: Control work area using any combination of barricade tape, road cones, saw horses, etc. to prohibit the entry of unauthorized personnel; use the buddy system.

3. Activity Specific Procedures:

(a) Task(s): Geophysical Survey

Procedures: Don protective equipment (safety boots); practice contaminant avoidance; watch for uneven walking surfaces.

Action Levels: N/A

3. (b) Task(s): Collect subsurface soil samples.

Procedures: Don proper protective equipment (e.g. gloves, eye protection, etc.); use good drilling and sampling procedures; practice contamination avoidance; periodically monitor the bore hole; if odors are noted, upgrade to Level C and continue to monitor.

Action Levels: 19.5%-O₂; 10% of LEL; PID-bkgd=D; PID-bkgd-5 ppm for 5 min.=C; PID->5ppm for 5 minutes or peak of 30 ppm or greater, stop operations; RAD->2 mR/hr+stop work; leave area.

3. (c) Task(s): Collect ground water samples.

Procedures: Don proper protective equipment (e.g. gloves, eye protection, etc.); use good sampling procedures; practice contamination avoidance; periodically monitor the monitoring well and breathing zoner; if odors are noted, upgrade to Level C and continue to monitor.

Action Levels: 19.5%-O₂; 10% of LEL; PID-bkgd=D; PID-bkgd-5 ppm for 5 min.=C; PID->5ppm for 5 minutes or peak of 30 ppm or greater, stop operations; RAD->2 mR/hr+stop work; leave area.

4. Personnel and Equipment Decontamination:

- Remove gross contamination from tools, respirator, monitoring equipment, boots, etc. prior to leaving the work-site, using water, paper towels, hand-wipes, etc.
- Either completely decontaminate soiled equipment at the work-site using detergent and water (if possible), or wrap equipment in plastic bag for transport until complete decontamination is possible.
- Always follow established personal decontamination procedures and remove contaminated gloves, Tyvek suits, used cartridges, paper towels, etc. by placing in a plastic bag and arrange for proper disposal.
- Wash hands and face thoroughly with soap and water before lunch or coffee breaks, and as soon as practicable after finishing work for the day.
- Additional Decontamination: Follow decontamination procedures in the program plan if more extensive decontamination is needed.

Emergency Procedures

Personal Injury. If authorized, administer appropriate first aid. The injured may need to be transported to the nearest hospital. If possible, notify hospital in advance of incoming patient and nature of injury. If there is a question about whether it is safe to move the victim, DO NOT move the victim - instead, make him/her as comfortable as possible, and summon emergency assistance.

Chemical Exposure. If site personnel show signs of inhalation exposure, retreat to fresh air for recovery. If symptoms warrant, bring the injured to the nearest hospital for observation, and discontinue work at that location and consult with H&S representative.

In case of skin or eye irritation due to chemical contact, wash affected skin with soap and water, or flush eyes with generous amount of water. If irritation is serious, seek medical attention.

Fire. If the fire can be easily contained and extinguished, do so with a portable fire extinguisher. If explosion risk is present, do not attempt to extinguish - evacuate all personnel to a safe area and call the fire department (796-2220).

Spills. If safe to do so, contain the spill if materials and equipment are available. If these materials are not available or the release is beyond the capabilities of site personnel, contact local emergency responders who are trained and equipped to control and cleanup the release (796-2220).

Important Note: If site observations, sampling results, or any other information indicates the presence of chemical contaminants other than those specified herein, this health and safety plan becomes void, and a new plan must be prepared and approved!

The field logbook or Attachment D shall be completed to document daily health and safety activities in the study areas.

Project Manager _____

Health & Safety Plan Prepared By _____ **Date** _____

Health & Safety Plan Approved By _____ **Date** _____

Arthur D. Little, Inc. PPE Checklist

- ☒ 1. MSA Ultratwin full-face air-purifying respirator, in a protective plastic bag
- ☒ 2. Nose cup insert for MSA Ultratwin respirator
- ☒ 3. Ear-muff set which fits into hardhat
- ☒ 4. Optional: Eyeglass kit for MSA Ultratwin respirator
- ☒ 5. MSA cartridges for respirator OV/AG/HEPA (GMC-H)
- ☒ 6. Protective lenses cover for MSA Ultratwin respirator
- ☒ 7. Disposable ear plugs
- ☒ 8. Silvershield gloves
- ☒ 9. Natural rubber gloves
- ☒ 10. Nitrile gloves
- ☒ 11. Polyethylene Tyvek suit
- ☒ 12. Saranex Tyvek suit
- ☒ 13. Safety glasses with side shields
- ☒ 14. Goggles
- ☒ 15. Plastic disposal bags
- ☒ 16. Hardhat
- ☒ 17. Duct tape
- ☒ 18. Other (list below)

• _____
• _____
• _____

HASP, Fort Devens:	Supplement B
Section No.:	Appendix E
Revision No.:	2
Date:	May 6, 1994

Appendix E: UXO Subcontractor Safety Plan and Procedures

Not Required For This Supplement

Health and Safety Plan:Fort Devens
Section No.: Appendix F
Revision No.: 2
Date: May 6, 1994

Appendix F: Fort Devens Safety Regulations

See Health and Safety Plan

Health and Safety Plan:Fort Devens
Section No.: Appendix G
Revision No.: 2
Date: May 6, 1994

Appendix G: Laboratory Hygiene Plan

See Health and Safety Plan

Attachment A

Personnel Training and Physical Examination Record

See Health and Safety Plan

Attachment B

Site Health and Safety Plan Review Record

See Health and Safety Plan

Attachment C

Environmental Monitoring Record

See Health and Safety Plan

Attachment D

Daily Site Health and Safety Activity Report

See Health and Safety Plan

Attachment E

Fort Devens Examples of Contaminants On-Site

Compound	PEL/TLV	Routes of Exposure	Acute Symptoms	Odor Description
Kerosene (Fuel Oil)	--	Inh, Ing, Abs, Con	Respiratory irritation, vomiting, diarrhea	Oil
Petroleum Hydrocarbons (Stoddard Solvent)	100 ppm	Inh, Con, Ing	Irrit, eyes, nose, throat; dizz; dermat	Kerosene-like odor
Polychlorinated Biphenyls (PCBs)	0.5 mg/m ³	Inh, Abs, Ing, Con	Irrit, eyes, nose, throat; dizz; dermat	Mild hydrocarbon

Attachment F

Accident Report form (DA Form 285)

See Health and Safety Plan

Attachment G
Resumes for Key Personnel

Anthony J. Parkin

Education

B.S. Geology/Oceanography, University College Swansea, Wales - 1979

Qualifications

Mr. Parkin is a highly experienced environmental scientist who has recently performed as Chief Scientist on a large ecological assessment survey, and is presently managing a marine monitoring program for Arthur D. Little. He has over 10 years experience in the area of oceanographic and marine geophysical data collection, data processing, and report production. He has worked worldwide on a variety of projects for both private industry and various government agencies. He has worked in both Venezuela and Brazil evaluating the environmental impact of oilfield development.

Prior to joining Arthur D. Little, Mr. Parkin worked for various marine scientific companies involved mostly with project planning and management, combined with data acquisition and interpretation. He has also worked on various land based projects including mineral prospecting involving drilling and numerous stream and river surveys.

Professional Experience

Consultant, Arthur D. Little, Inc. (1991-present)

Chief Scientist, Arthur D. Little, Inc. (1990)

Assistant Engineer for EG&G Oceanographic Services, Inc. (1988-1990)

Marine Geophysicist, Private consultant (1986-1990)

Senior Geophysicist, Comap GeoSurveys, Inc. (1983-1986)

Senior Observer, Western Geophysical, Inc. (1981-1982)

Hydrocarbon Well Logger, Core Lab, Inc. (1980-1981)

Geologist, Alluvial Mining (1979-1980)

Principal Projects

Chief Scientist for the field season of a shoreline ecology program in Prince William Sound, Alaska (1990)

Planning and performed a marine geophysical survey offshore from the San Onofre nuclear power station in Southern California. (1989)

Anthony J. Parkin (continued)

Marine Scientist on a geophysical/oceanographic survey offshore Amchitka Island, Alaska. This involved proposal writing, equipment selection, data acquisition, interpretation and report production. (1989)

Party chief for marine geophysical survey with seabed coring to investigate a proposed fiber optic telephone cable route from Japan to the USA. This work took place in Oregon and Alaska. Following the field program, extensive data interpretation and report production took place in the UK. (1988)

Assistant field technician involved in stream gauge studies and the acquisition of meteorological data at the Red Dog mine site in Alaska. (1988)

Geophysical party chief on a summer-long survey offshore, Nome, Alaska, working to delineate areas of marine placer gold deposits. Following the field work, data interpretation and analysis took place in Nome. (1987)

Party chief for a large geophysical/geochemical program in the Gulf of Mexico combining seabed geological fault location and seabed sediment coring and subsequent sample collection. (1984/5)

Program Manager for the summer season in the Beaufort Sea, Alaska, controlling two seismic boats responsible for contract bidding program, planning, data quality and program financial control. (1984/5)

Party chief on a series of marine surveys throughout West Africa being responsible for data quality control/acquisition and all the associated problems involved in working in remote areas. (1983)

Responsible for drilling monitoring and core catching on the Murchison Platform in the North Sea. (1981)

Richard W. Waterman

Mr. Waterman is a Senior Consultant in the Site Assessment and Remediation Unit of the Earth Sciences and Engineering Business Segment at Arthur D. Little, Inc. His primary professional interests are in the field of site investigation and the implementation of remediation technologies. He has worked with both commercial and government clients assisting them in implementing cost efficient environmental management solutions. His consulting assignments include site investigations and assessments, environmental auditing, and regulatory analysis.

Some examples of Mr. Waterman's experience include:

- Conducting site assessments and due diligence reviews. He has had many client assignments conducting environmental site assessments associated with property transfers. These typically fast moving cases involve assessing the potential for site contamination associated with past industrial activities and recommending solutions for remediating the site. This work can directly affect the decision to purchase or sell industrial property.
- Two large assignments evaluating the potential liability for site remediation costs for a Fortune 500 pharmaceutical company and an large insurance company. This analyses included reviewing proposed remediation techniques, proposing alternative methodologies and conducting a cost comparison analyses. These studies provided independent third party analyses of remediation costs which potentially saved these companies from costly remediation techniques.
- Conducting environmental audits of both government and commercial operations. Mr. Waterman's principle area of expertise is auditing water pollution control activities including evaluating potential surface and ground water contamination. These audits typically include assessing regulatory requirements and evaluating physical operations. His client assignments have included military installations, mining operations, and utilities.
- For the past three years, operating as the Quality Assurance officer for Arthur D. Little for a USEPA Region I ARCS contract. His responsibilities included ensuring that all aspects of Arthur D. Little's work on the Superfund sites meet quality objectives. He is provided quality assurance oversight on eleven Superfund sites.

Mr. Waterman received an M.S. in Environmental Engineering from Northeastern University after receiving one of two EPA traineeships awarded within this graduate program and a B.A. in Chemistry/Biology from the University of Delaware. He is a member of the Water and Environment Federation. In addition, he is a certified hazardous waste site supervisor having completed both 40 hours of OSHA safety training and 8 hours safety supervisory training.



U.S. Army
Environmental
Center

Final Health and Safety Plan

Supplement C

Base Realignment and Closure Environmental Evaluation Fort Devens, Massachusetts

Submitted to

**U.S. Army Environmental
Center (USAEC)
Formerly USATHAMA
Aberdeen Proving Ground, Maryland**

**Revision 1
November 14, 1994.**

**Arthur D. Little, Inc.
Acorn Park
Cambridge, Massachusetts
02140-2390**

ADL Reference 67071-15

**DAAA15-91-D-0016
Delivery Order 0011**

Final Health and Safety Plan

Supplement C

**Base Realignment and
Closure Environmental
Evaluation
Fort Devens,
Massachusetts**

R. N. Lambe
Project Manager, Robert Lambe

11-16-94
Date

Richard W. Waterman
Task Manager, Richard Waterman

11/14/94
Date

Program Health and Safety Officer,
Corey W. Briggs CIH,CET

Date

Submitted to

**U.S. Army Environmental
Center (USAEC)
Formerly USATHAMA
Aberdeen Proving
Ground, Maryland**

**Revision 1
November 14, 1994**

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Acorn Park
Cambridge, Massachusetts
02140-2390**

ADL Reference 67071-15

**DAAA15-91-D-0016
Delivery Order 0011**

Arthur D Little

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- 2.0 Training
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- 4.0 Sanitation
- 5.0 Fire Prevention
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- 7.0 Individual Protective Equipment
- 8.0 Tools
- 9.0 Powered Equipment
- 10.0 Hazardous and Toxic Materials
- 11.0 Emergencies
- 12.0 Accident Reporting, Analysis and Prevention
- 13.0 Site Safety Inspections

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Appendix E: UXO Subcontractor Safety Plan and Procedures

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Attachment A: Personnel Training and Physical Examination Record

Attachment B: Site Health and Safety Plan Review Record

Attachment C: Environmental Monitoring Record

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Attachment E: Fort Devens Examples of Contaminants On Site

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HASP, Fort Devens:	Supplement C
Section No.:	1.0
Revision No.:	1
Date:	November 14, 1994

1.0 Introduction

Supplement C of the Final Health and Safety Plan, Fort Devens, Massachusetts addresses oversight of Arthur D. Little's subcontractor conducting asbestos surveys and lead paint assessments at Fort Devens. The asbestos and lead paint subcontractor will be expected to adhere to the minimum requirements set forth in this plan. More detailed descriptions of site-specific work is detailed in the site-specific HASPs included in the supplements to the HASP, as well as the Work Plan and Quality Assurance Project Plan for the asbestos, radon, and lead paint work.

Please refer to the Health and Safety Plan for additional discussion.

2.0 Staff, Organization, and Responsibilities

2.1 Project Staff and Health and Safety Organization

The personnel and their organizations listed below will be performing various on-site and/or off-site activities (see Figure 2-1C). The USAEC Project Manager will be notified promptly of any potential on-site health and safety problems and changes in the health and safety organization. Telephone numbers are provided in Section 7.8.8 of this plan.

2.1.1 USAEC

- Project Manager: Charles George
- Health and Safety Officer: William P. Houser

2.1.2 Fort Devens

- Health and Safety Officer: Richard Theobald

2.1.3 Arthur D. Little, Inc.

- Program Manager: Robert Lambe
- Task Manager: Richard Waterman
- Deputy Task Manager: Erica Cahill
- Health and Safety Staff:
 - Corporate Director of Health and Safety (CDHS): R.S. Stricoff, CIH, CSP
 - Project Field Supervisor: Erica Cahill
 - Health and Safety Officer (HSO): Corey Briggs, CIH CET
 - Health and Safety Officer, Alternate: Peter Roy, CIH
 - Site Health and Safety Officer (SHSO): Erica Cahill
 - Site Health and Safety Officer, Alternates: To be determined
 - Task Health and Safety Officer (THSO): To be determined in the field

2.2 Responsibilities

2.2.1 Task Manager/Deputy Task Manager

See Health and Safety Plan

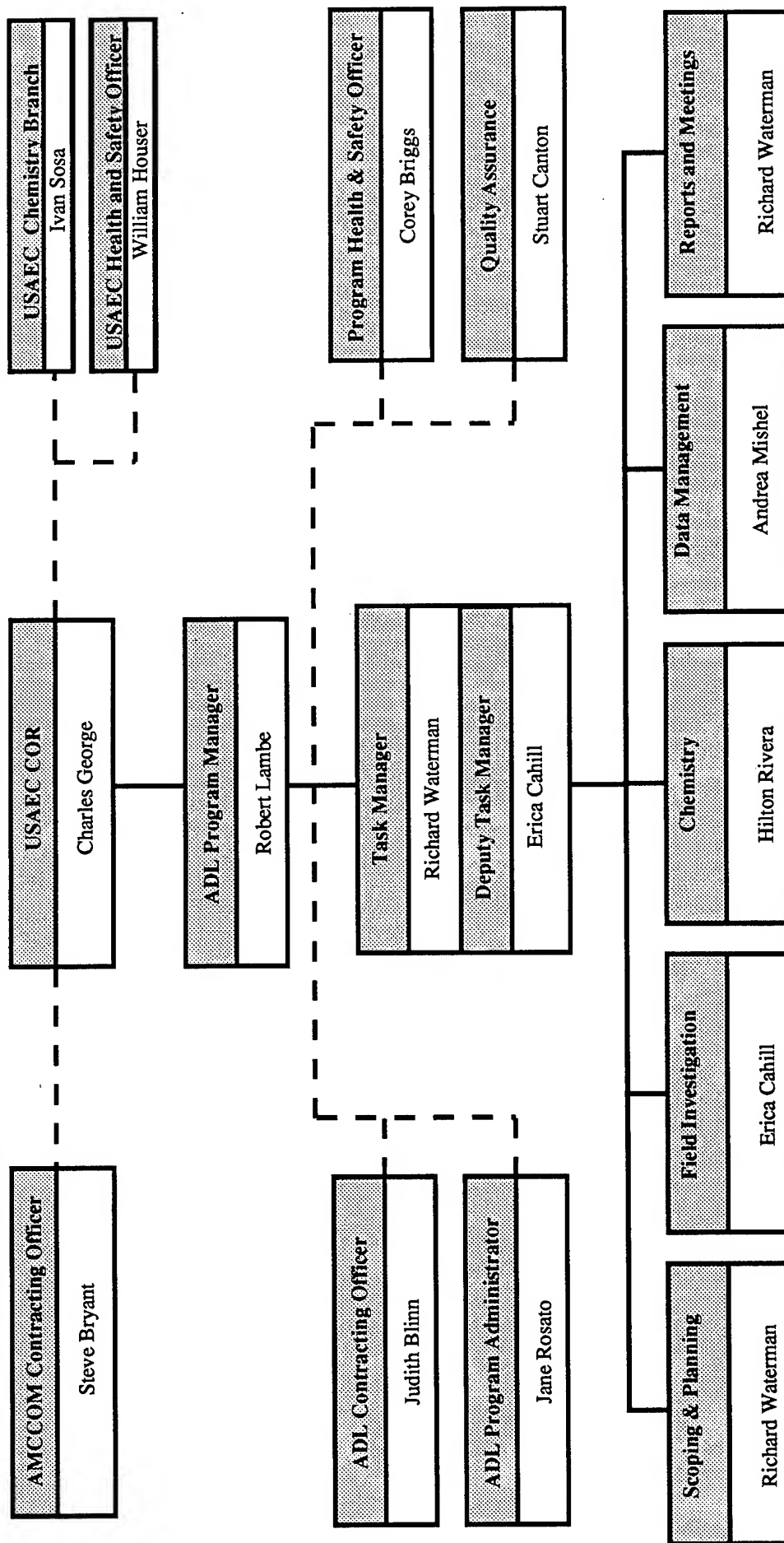
2.2.2 Project Field Supervisor

See Health and Safety Plan

2.2.3 Corporate Director of Health and Safety (CDHS)

See Health and Safety Plan

Figure 2-1C: Fort Devens Base Realignment and Closure Part II - Organizational Chart



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2.2.4 Health and Safety Staff (HSO and Alternate HSO)

See Health and Safety Plan

2.2.5 Site Health and Safety Officer (SHSO)

See Health and Safety Plan

2.2.6 Site Health and Safety Officer - Alternates(s)

See Health and Safety Plan

2.2.7 Task Health and Safety Officer

See Health and Safety Plan

2.2.8 Field Geologists, Sampling Technicians, Chemists, and Field Personnel

See Health and Safety Plan

2.2.9 Subcontract Personnel

See Health and Safety Plan

3.0 Hazard Communication and Training

3.1 Health and Safety Training

All subcontractor personnel conducting asbestos and lead surveys will be required to prove to Arthur D. Little that they have completed training in accordance with 29 CFR 1926.58, and 453 CMR 6.00 for asbestos and 29 CFR 1910.1025 and 105 CMR 460.000 for lead. Arthur D. Little personnel will not be conducting asbestos or lead paint surveys. Arthur D. Little personnel will have received training and/or experience that at a minimum satisfies the applicable OSHA regulations (29 CFR 1910.120). Contractor personnel must also possess current hazardous materials transportation training per HM 181/HM 126-F.

3.2 Health and Safety Site Orientation

See Health and Safety Plan

3.3 Site Documentation

See Health and Safety Plan

3.4 Health and Safety Briefings

See Health and Safety Plan

3.5 Post-Investigation Health and Safety Briefing

See Health and Safety Plan

3.6 Subcontractor Personnel

See Health and Safety Plan

See Attachment H and I - Subcontractor Health and Safety Plan

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4.0 Medical Surveillance and Exposure Monitoring

4.1 Medical Surveillance

See Health and Safety Plan

4.2 Exposure Monitoring

See Health and Safety Plan

5.0 Health and Safety Equipment

5.1 Personal Protective Equipment

5.1.1 General

Arthur D. Little personnel will wear Level D personal protection while working directly with the subcontractor during inspections. Subcontractor personnel will wear Level D or Level C (if necessary) protection while conducting asbestos and lead paint sampling.

See Health and Safety Plan

5.1.2 Respiratory Protection

See Health and Safety Plan

5.1.3 Maintenance and In-use Inspection of Protective Equipment

See Health and Safety Plan

5.2 Environmental Monitoring Equipment

5.2.1 General

The subcontractor shall be responsible for conducting any personnel or area monitoring for asbestos or lead in accordance with established state and/or federal requirements.

5.2.2 Real Time Air Monitoring

See Health and Safety Plan

5.2.3 Perimeter Monitoring

N/A

5.2.4 Flammable/Combustible Gases

N/A

5.2.5 Oxygen Deficiency

N/A

5.2.6 Respirable Dust

N/A

5.2.7 Calibration and Maintenance

N/A

5.2.8 Recordkeeping Requirements

N/A

5.2.9 Heat Stress

See Health and Safety Plan

5.2.10 Action Levels

N/A

5.2.10.1 Chemical Vapors. N/A

5.2.10.2 Explosive Limit Detection. N/A

5.2.10.3 Oxygen Deficiency. N/A unless contractor conducts confined space entry. If confined space entry is required, subcontractor personnel will not be allowed to enter confined spaces until a confined space entry program has been submitted to Arthur D. Little and approved by the HSO.

5.2.10.4 Radiation Detection. N/A

5.3 Emergency Equipment

See Health and Safety Plan

6.0 Background, Site Location, and Site Description

6.1 Background

See Health and Safety Plan

6.2 Site Location and Description

See Health and Safety Plan

6.3 Site-Specific Actions

The BRAC EE (Part II) addresses three site-wide Areas Requiring Environmental Evaluation (AREE):

- Asbestos (AREE 65)
- Radon (AREE 67)
- Lead Paint (AREE 69)

These three AREEs are located throughout Fort Devens' Main and North Posts. See Table 2-1 in the Draft Supplemental Work Plan for Fort Devens BRAC EE, Part II, which identifies the buildings undergoing asbestos and/or lead paint inspections. The site specific Health and Safety Plan in Appendix D contains detailed information on the site specific activities (e.g., building inspections) to be conducted at each area. Additional information is provided in the Supplemental Work Plan.

7.0 Health and Safety Procedures

7.1 Site-Specific Health and Safety Plan

See Health and Safety Plan

7.2 Work Zones and Site Control

See Health and Safety Plan

7.2.1 Work Zones

See Health and Safety Plan

7.2.2 Exclusion Zones

N/A

7.2.3 Contamination Reduction/Decontamination Zones

N/A

7.2.4 Support Zone

N/A

7.2.5 Site Entry and Exit

N/A

7.2.6 Site Access and Parking

See Health and Safety Plan

Only vehicles necessary to the existing operations should be driven on site.

7.2.7 Buddy System

See Health and Safety Plan

7.3 Environmental Monitoring

Site-specific monitoring requirements are provided in the site-specific plan contained in Appendix D.

7.4 Safe Work Practices

7.4.1 General

See Health and Safety Plan

7.4.2 Daily Start-up and Shutdown Procedures

See Health and Safety Plan

7.4.3 Confined Space Entry

See Health and Safety Plan

7.4.4 Tanks, Drums, and Barrels

See Health and Safety Plan

Unidentified tanks, drums, and barrels will most likely not be encountered during investigations under this task.

7.4.5 Accident Prevention Plan

See Health and Safety Plan

7.5 Site Entry Procedures

See Health and Safety Plan

7.6 Decontamination

7.6.1 Exclusion and Decontamination Zones

N/A

7.6.2 Decontamination Procedures

The subcontractor shall properly decontaminate and dispose of their personal protection equipment according to their decontamination protocol.

7.6.2.1 Partial Decontamination. See Health and Safety Plan

7.6.2.2 Complete Decontamination. See Health and Safety Plan

7.6.3 Decontamination Notice to Emergency Personnel

See Health and Safety Plan

7.6.4 Equipment Decontamination

The subcontractor shall properly decontaminate their sampling equipment according to their decontamination protocol.

7.6.5 Disposal of Wastes During Investigative Activities

See Health and Safety Plan

7.7 Communications and Equipment

See Health and Safety Plan

7.8 Emergency Action Plan

See Health and Safety Plan

7.8.1 Pre-Emergency Planning

See Health and Safety Plan

7.8.2 Emergency Recognition and Prevention

See Health and Safety Plan

7.8.3 Emergency Equipment

See Health and Safety Plan

7.8.4 Operations Shutdown

See Health and Safety Plan

7.8.5 Fire and Explosion Response Procedures

See Health and Safety Plan

7.8.6 Spills, Releases, Leaks of Hazardous Materials

See Health and Safety Plan

7.8.7 Evacuation from Work Zones

See Health and Safety Plan

7.8.8 Emergency Telephone Numbers

See Health and Safety Plan

Other Important Numbers

See Health and Safety Plan

Arthur D. Little, Inc.
(617) 498-5000 (Main Number)
Richard Waterman (Task Manager) x5562
Corey Briggs, CIH (HSO) x6106
Peter Roy, CIH (AHSO) x6112
Chris Martel, CHP (RSO-Radiation) x6103
R.S. Stricoff, CIH, CSP (CHSO) x5884

7.8.8.1: Site-Specific Directions to Cutler Army Hospital. Due to the large number and location of buildings included in this task, site-specific directions to the Cutler Army Hospital are not specifically included in this plan. However, provisions will be made at the beginning of each day to ensure that personnel are completely familiar with the location of their work area with respect to Cutler Army Hospital. Other emergency response procedures and communication arrangements will be discussed with all personnel as part of the daily safety meeting.

7.8.9 Reporting Incidents

7.8.9.1 Large-Scale Incidents. See Health and Safety Plan

7.8.9.2 Accidents, Injuries, Illnesses. See Health and Safety Plan

7.9 First Aid Emergency Procedures

7.9.1 Chemical Exposures

See Health and Safety Plan

8.0 Site Hazard Summary

See Health and Safety Plan

8.1 Unexploded Ordnance (UXO)

N/A

8.2 Chemical and Radioactive Hazards

N/A

8.3 Physical Hazards

See Health and Safety Plan

Drilling will not be conducted under this task.

8.3.1 Abatement of Physical Hazards

See Health and Safety Plan

8.3.2 Fire/Explosion

N/A

8.3.3 Buried Utility Lines

N/A

8.3.4 Drilling

N/A

8.3.5 Sampling

N/A

8.3.6 Excavation Safety

N/A

8.3.7 Aquatic Activities

N/A

8.4 Environmental Hazards

8.4.1 General

See Health and Safety Plan

8.4.2 Insect/Pest Hazards

See Health and Safety Plan

8.4.3 Heat Stress Hazards

See Health and Safety Plan

8.4.4 Cold Stress Hazards

See Health and Safety Plan

8.5 Initial and Continued Site Evaluation

See Health and Safety Plan

8.6 Hazardous Materials Packaging and Transportation

See Health and Safety Plan

All packaging and transportation of asbestos and lead samples shall be in accordance with the provisions of the Department of Transportation's HM 181 and HM 126-F standards or IATA requirements (air transport via Federal Express).

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Appendix A: Health and Safety Training Requirements

See Health and Safety Plan

All subcontractor employees assigned to this task are required to meet all the training requirements for lead and asbestos as provided in federal OSHA and State of Massachusetts standards and regulations.

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Appendix B: Medical Monitoring Requirements

See Health and Safety Plan

Appendix C: Accident Prevention Plan

1.0 Responsibilities

See Health and Safety Plan

2.0 Training

See Health and Safety Plan

3.0 General Safety Precautions

See Health and Safety Plan

4.0 Sanitation

See Health and Safety Plan

5.0 Fire Prevention

See Health and Safety Plan

6.0 Housekeeping

See Health and Safety Plan

7.0 Individual Protective Equipment

See Health and Safety Plan

8.0 Tools

See Health and Safety Plan

9.0 Powered Equipment

N/A

10.0 Hazardous and Toxic Materials

See Health and Safety Plan

11.0 Emergencies

See Health and Safety Plan

12.0 Accident Reporting, Analysis and Prevention

See Health and Safety Plan

13.0 Site Safety Inspections

See Health and Safety Plan

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Appendix D: Site-Specific Health and Safety Plan

**Site-Specific
Health and Safety Plan
Arthur D. Little, Inc.**

This plan is applicable for sites where the work involves asbestos or lead contamination. Please reference the Arthur D. Little Hazardous Waste Operation Health and Safety Program Plan for detail on the overall program. A copy of the most current Arthur D. Little Health and Safety Program Plan for Hazardous Waste Site Operations (April 1992) and the Fort Devens Main Post Health and Safety Plan shall be available at the site in addition to other applicable documentation.

Job Name Fort Devens BRAC EE, Part II **Case No.** 67071

Site Location Various Buildings On Site

Site History Due to the age of many of the base buildings, asbestos-containing materials (ACM) have more than likely been utilized for insulation, building coverings, and soundproofing. In addition, lead paint was probably used throughout many of the buildings on base.

Site Description/Nature of Work This project will involve collecting samples of suspect asbestos-containing materials and paint to determine the presence and concentration of asbestos and lead, respectively.

Dig Safe and Other Utilities Notified N/A

By Whom N/A **Date** N/A

Response N/A

File Numbers N/A

Primary Level of Protection: ADL Personnel - Level D; Subcontractor Personnel - Level C.

Contingency Level of Protection: N/A

Emergency Phone Numbers

ADL Health and Safety Office: Primary 800-677-3000 x6106 (C. Briggs), Alternate 800-677-3000 x6112 (P. Roy), Alternate 800-677-3000 x5884 (S. Stricoff)

Ambulance: 769-6911 **Fire:** 796-2220 **Police:** 796-3333

Hospital:

Name Culter Army Hospital

Address Building 3654 - Fort Devens

Hospital Phone Number 796-6911

Attach written directions and a map of the route to the nearest hospital (Attachment 1)

Other: Nashoba Community Hospital **Phone No.** 772-2657

Environmental/H&S - Jim Chambers **Phone No.** 796-3114

Location of Nearest Phone: Will vary from building to building.

Site Hazards

Chemical Hazards (overview, include source and location of contaminants):

Asbestos-containing materials and lead.

Representative Chemicals and PEL/TLV/IDLH

<u>Inorganic Lead</u>	<u>Asbestos</u>
<u>PEL: 0.05 mg/m³</u>	<u>PEL: 0.2 mg/m³</u>
<u>blood lead levels <0.06 mg/100g</u>	<u>TLV: Amosite 0.5 f/cc</u>
<u>of whole blood</u>	<u>Chrysotile 2 f/cc</u>
<u>TLV: 0.15 mg/m³</u>	<u>Crocidolite 0.2 f/cc</u>
<u>REL: 0.100 mg/m³</u>	<u>Other forms 2 f/cc</u>
<u>IDLH: 700 mg/m³</u>	

Factors Indicating the Nature of the Potential or Known Contaminants at the Site:

Site History: ✓ **Previous Sampling Results:** _____ **Current Use:** _____

Explain: ACM and lead paint used in past.

Major Routes of Exposure: Inhalation primary; ingestion if good hygiene not practiced; potential eye exposure; dermal irritation potential, injection from cuts caused by sharp objects.

Symptoms of Exposure/Potential Health Effects: Asbestos: Dyspnea, interstitial fibrosis, restricted pulmonary function, finger clubbing, carcinogen. See 29 CFR 1910.1001 and 29 CFR 1926.58 for more information. Lead: Weakness, lassitude, facial pallor, low weight, anorexia malnutrition, constipation, abdominal pain, colic, anemia, gingival level line, tremor, ankle and wrist paralysis, encephalopathy nephropathy, irritation of eyes, hypotension. See 29 CFR 1910.1025 for more information.

Physical Hazards

Slips, trips, and falls, falling objects, hand, foot and back injuries, cuts, punctures, etc.

Noise Hazards

No noisy equipment is expected to be used. However, proper hearing protection (ear muffs or plugs) must be worn when near a source of loud noise.

Fire Hazards: Be aware of hot surfaces, have fire extinguisher available or determine location of nearest unit.

Electrical Hazards: Be aware of energized sources near sampling areas.

Oxygen Deficiency: N/A - unless subcontractors conduct confined space entry.

Confined Space Entry: Subcontractor must follow provisions of 1910.146.

Radioactive Materials: N/A

Other Hazards: Heat stress, cold stress (if outdoors), environmental hazards (e.g., ticks, insects, etc.), poor lighting.

Personnel Health and Safety Requirements

Medical Monitoring Requirements. Site personnel must be participants in Arthur D. Little's, or similar, medical monitoring program, and must have had their most recent exam within the previous 12 months. The exam must have indicated no medical restrictions that would inhibit personnel from performing the required work tasks. Examinations for asbestos and lead must be current per regulations.

Training Requirements. Arthur D. Little site personnel must have the current, relevant health and safety training and/or experience, which included coverage of hazard recognition, etc. Personnel must also be oriented to the components of this site-specific plan. Attachment A shall be utilized to document training and physical examination records of site personnel. Attachment B shall be used to document orientation to this site-specific plan. Subcontractors shall meet all of the training requirements for lead and asbestos as provided in federal OSHA and State of Massachusetts standards and regulations.

Site Health and Safety Procedures

Procedures for a Site "Walk-Over":

Practice contamination avoidance at all times; do not step in areas of obvious contamination; Arthur D. Little personnel are not to touch ACM or lead materials; do not kneel on ground, floor or other potentially contaminated surfaces; all efforts must be made to minimize contaminating clean work areas.

Procedures for Intrusive Site Work: (Drilling, Test Pits, etc.)

A. Personal Protective Equipment (ADL Personnel):

1. (a) PPE should be used on the site. (See the PPE Checklist attached to this plan; Attachment 2).

(b) Type of Respirator Cartridges: N/A

2. Additional Personal Protective Equipment:

N/A

B. Monitoring Equipment: N/A

C. Additional Safety Equipment: N/A

D. Health and Safety Work Procedures:

1. Site Briefings: Conduct a daily briefing with site personnel and go over work objectives and the major elements of this plan.

- Tailgate Safety Meeting Form
- In Field Notebook

2. Site Control: Sampling areas are to be cordoned off per contractor's sampling protocol.

3. Activity Specific Procedures:

(a) Task(s): Collect ACM samples.

Procedures: Subcontractor to follow their established sampling protocols.

Action Levels: N/A

3. (b) Task(s): Collect lead paint samples.

Procedures: Subcontractor to follow their established sampling protocols.

Action Levels: N/A

Other tasks (if applicable) are attached.

4. Personnel and Equipment Decontamination:

- Contractor to follow their established protocols.
- Remove gross contamination from tools, respirator, monitoring equipment, boots, etc. prior to leaving the work-site, using water, paper towels, handi-wipes, etc.
- Either completely decontaminate soiled equipment at the work-site using detergent and water (if possible), or wrap equipment in plastic bag for transport until complete decontamination is possible.
- Always follow established personal decontamination procedures and remove contaminated gloves, Tyvek suits, used cartridges, paper towels, etc. by placing in a plastic bag and arrange for proper disposal.
- Wash hands and face thoroughly with soap and water before lunch or coffee breaks, and as soon as practicable after finishing work for the day.
- Additional Decontamination: Per subcontractor protocols.

Emergency Procedures

Personal Injury. If authorized, administer appropriate first aid. The injured may need to be transported to the nearest hospital. If possible, notify hospital in advance of incoming patient and nature of injury. If there is a question about whether it is safe to move the victim, DO NOT move the victim - instead, make him/her as comfortable as possible, and summon emergency assistance.

Chemical Exposure. If site personnel show signs of inhalation exposure, retreat to fresh air for recovery. If symptoms warrant, bring the injured to the nearest hospital for observation, and discontinue work at that location and consult with H&S representative.

In case of skin or eye irritation due to chemical contact, wash affected skin with soap and water, or flush eyes with generous amount of water. If irritation is serious, seek medical attention.

Fire. If the fire can be easily contained and extinguished, do so with a portable fire extinguisher. If explosion risk is present, do not attempt to extinguish - evacuate all personnel to a safe area and call the fire department (796-2220).

Spills. If safe to do so, contain the spill if materials and equipment are available. The subcontractor to clean up asbestos spills in accordance with their established protocols. If these materials are not available or the release is beyond the capabilities of site personnel, contact local emergency responders or the contractor's cleanup service who are trained and equipped to control and clean up the release (796-2220 - Base).

Important Note: If site observations, sampling results, or any other information indicates the presence of chemical contaminants other than those specified herein, this health and safety plan becomes void, and a new plan must be prepared and approved!

The field logbook or Attachment D shall be completed to document daily health and safety activities in the study areas.

Project Manager _____

Health & Safety Plan Prepared By _____ **Date** _____

Health & Safety Plan Approved By _____ **Date** _____

Arthur D. Little, Inc. PPE Checklist For ADL Personnel

Note: Subcontractors must provide all of their own equipment which will involve use of a complete Level C ensemble.

- ☐ 1. MSA Ultratwin full-face air-purifying respirator, in a protective plastic bag
- ☐ 2. Nose cup insert for MSA Ultratwin respirator
- ☐ 3. Ear-muff set which fits into hardhat
- ☐ 4. Optional: Eyeglass kit for MSA Ultratwin respirator
- ☐ 5. MSA cartridges for respirator _____
- ☐ 6. Protective lenses cover for MSA Ultratwin respirator
- ☐ 7. Disposable ear plugs
- ☐ 8. Silvershield gloves
- ☐ 9. Natural rubber gloves
- ☐ 10. Nitrile gloves
- ☐ 11. Polyethylene Tyvek suit
- ☐ 12. Saranex Tyvek suit
- ☒ 13. Safety glasses with side shields
- ☐ 14. Goggles
- ☐ 15. Plastic disposal bags
- ☒ 16. Hardhat
- ☐ 17. Duct tape
- ☒ 18. Other (list below)
- Standard work clothes or coveralls for other activities.

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Appendix E: UXO Subcontractor Safety Plan and Procedures

Not required for this supplement

Health and Safety Plan:Fort Devens
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Appendix F: Fort Devens Safety Regulations

See Health and Safety Plan

Attachment A

Personnel Training and Physical Examination Record

See Health and Safety Plan

Attachment B

Site Health and Safety Plan Review Record

See Health and Safety Plan

Attachment C

Environmental Monitoring Record

See Health and Safety Plan

Not applicable to this task

Attachment D

Daily Site Health and Safety Activity Report

See Health and Safety Plan

Attachment E

**Fort Devens
Examples of Contaminants On Site**

Not applicable to this task

Attachment F

Accident Report form (DA Form 285)

See Health and Safety Plan

Attachment G
Resumes for Key Personnel

Erica L. Cahill

Ms. Cahill is a consultant in Environmental Business and Strategy at Arthur D. Little. Her expertise focuses in the areas of environmental and technical analysis and solid and hazardous waste management. Examples of her previous project experience include the following:

- Performed risk assessments of 56 motor pools and maintenance areas at an Army Base to evaluate potential releases of contaminants to the environment and recommend future sampling to assess the extent of possible contamination.
- Conducted an environmental audit of a railroad facility with respect to federal, state and local regulations related to the Clean Water Act. Responsibilities included reviewing NPDES permit requirements, SPCC plans for the management of oil and petroleum products and best management practices for the management of hazardous chemicals.
- Performed due diligence assessments on manufacturing and non-manufacturing facilities in the United States. Specific responsibilities included, but were not limited to, solid and hazardous waste management and asbestos control.
- To help a client better understand the role of pollution control regulations in the relocation of production facilities and capital stock from one country to another, Ms. Cahill analyzed the cost differences of environmental compliance in developed and developing countries. She analyzed environmental regulations in these countries as they pertain to the chemical industry, observing how the regulations influence production costs and location decisions.
- Performed an environmental assessment on a dam and water way in the northeast. The assessment reviewed the facility's compliance with federal, state and local regulations. Her responsibilities included reviewing the company's solid and hazardous material management programs, PCB programs and asbestos management programs.
- Assisted in conducting remedial investigations and feasibility studies to assess site conditions and develop a remedial plan at Superfund Sites in the northeast. Conducted groundwater sampling, sediment sampling, residential well sampling, soil boring, monitoring well installation, trenching of test pits, deep bedrock well installation and hydraulic testing.
- Conducted environmental compliance audits for various health facilities across the United States. The study reviewed the facility's compliance with state and federal, as well as local regulations. Her responsibilities included solid and hazardous waste, PCB, asbestos, water, underground storage tank, and spill control management.
- Performed an environmental assessment on a paper mill in Canada. Her responsibilities included, but were not limited to, a historical review of the facility and asbestos and PCB management.
- Managed large and small scale asbestos abatement projects in manufacturing, utility, hotel and school facilities. Conducted asbestos assessments of sites prior to an abatement to determine the extent of suspect asbestos material. Collected suspect asbestos containing samples to determine asbestos type and content.

Ms. Cahill graduated from Trinity College in Hartford, Connecticut, with a B.S. in Computer Science and Biology. She is currently working on her Master's in Hazardous Materials Management at Tufts University.

Arthur D Little

Richard W. Waterman

Mr. Waterman is a senior consultant in the Site Assessment and Remediation Unit of the Earth Sciences and Engineering Business Segment at Arthur D. Little, Inc. His primary professional interests are contaminated site investigation and the implementation of remediation technologies. He has worked with both commercial and government clients, assisting them in implementing cost efficient environmental management solutions. His consulting assignments include site investigations and assessments, environmental auditing, and regulatory analysis. Some examples of Mr. Waterman's experience include:

- For the U.S. Army Environmental Center (USAEC), Mr. Waterman is managing a \$1.7 million contract evaluating potential contamination of an Army base scheduled for closure. This study includes evaluating motor pools, maintenance shops, hangar facilities, past spill sites, and previously removed underground storage tanks for contamination. In addition, a comprehensive evaluation and sampling of storm sewers is being conducted to help evaluate potential routes of contamination.
- Mr. Waterman served as the Quality Assurance Officer (QAO) for Arthur D. Little's ARCS contract with EPA Region I. His duties included providing quality assurance oversight on 11 separate Superfund sites. Mr. Waterman conducted both systems audits and functional audits of each task under this contract. As the QAO, he reported directly to the corporate quality assurance officer and routinely provided recommendations to the ARCS Program Manager.
- For a complex site investigation of the Army Materials Testing Laboratory in Watertown, Mass., Mr. Waterman served as the project Quality Assurance Officer. This task included a complex investigation of contaminated soils and ground water. This project was a high profile assignment in both the Army and the surrounding community because of the size of the laboratory and its prominent position within the community. Mr. Waterman's duties included routine visits to the site to ensure conformance with sampling and drilling protocols and review of all deliverables for accuracy.
- Mr. Waterman managed and provided field oversight for a large subsurface trenching investigation at an Army laboratory. Trenching was the appropriate technology because of the number of buildings that were historically located on site. This job involved trenching the site, conducting subsurface soil samples, and restoring the area to its original condition.

Mr. Waterman received an M.S. in Environmental Engineering from Northeastern University after receiving one of two EPA traineeships awarded within this graduate program and a B.A. in Chemistry/Biology from the University of Delaware. He is a member of the Water and Environmental Federation. In addition, he is a certified hazardous waste site supervisor having completed both 40 hours of OSHA safety training and 8 hours safety supervisory training.

Arthur D Little

Attachment H

Subcontractor Health and Safety Plan

I. SITE SAFETY OFFICER

The designated Site Safety Officer for this project is Roberto R. Mercado who is an EPA Accredited Asbestos Inspector and Abatement Supervisor. Mr. Mercado shall be responsible for administering and enforcing the requirements of this plan.

II. SURVEY METHODS & PROCEDURES

The following summarizes the standard methods and steps that will be followed by a 2-person survey team in inspecting and testing a building for suspect asbestos-containing materials.

1. Survey Team Leader schedules building survey dates (and specific access times) with the Client at least forty-eight (48) hours in advance. Team Leader also advises client of the need to be able to ensure access to all rooms, and establishes specific building access times and limitations, especially with regard to sensitive and secure areas, or the use of special access equipment.
2. Team meets with designated building Contact(s) and other officials upon arrival and briefs them on overall survey methods, procedures, and time tables.
3. Survey Team conducts a detailed walk-through survey of each building starting with exterior areas (to ascertain overall dimensions and layouts), followed by basement mechanical rooms (to ascertain types and layouts of plumbing, heating, and HVAC utility systems in the building). They then conclude by briefly inspecting all other spaces. During this walk-through, the types and approximate quantities of all suspect ACM are noted, appropriate numbers and locations of bulk samples are determined, and space configurations and uses are determined. This walk-through survey ensures a more efficient, orderly, and accurate detailed survey since the team can better plan its subsequent activities, understand space access and sampling problems, and then properly advise affected building officials.
4. Survey Team assembles required sampling and safety equipment and data forms (see attached listing of items).
5. Survey Team reviews available drawings, specifications, test data, and other information.

They also interview any knowledgeable officials concerning building layouts, utilities, construction details, space uses and operations.

6. Team reviews the results of the walk-through survey and establishes specific bulk sampling locations, defines building areas and space uses, and establishes the timetable and responsibilities for all remaining survey work.
7. Team obtains all necessary equipment and completes the detailed survey of each building, working together in the following manner (2-person team):
 - a. The survey technician collects all samples at locations identified by the Team Leader. This is accomplished by carefully wetting the material and then slowly removing a full-thickness section using a cork borer or knife.* Each sample is then placed in a sealed plastic bag, and is labeled (using the bag's write-on labels) with a unique identification code and description. This person then cleans up any observed sampling debris with a HEPA vacuum or a wet disposable cloth. He/She will also repair the sampling point (using either a sprayed-on liquid encapsulant, or duct or wettable fiberglass tape). This person also labels the sampling point; and photographs the area and/or any nearby damaged/deteriorated insulation. An approved respirator is worn by this person throughout the sample collection stage.
 - b. The Team Leader completes our standard survey data sheet and our "Asbestos Bulk Sample Analysis Record Form" (including its "Sample Accountability" section). They will also identify and describe the type, function, and substrate surface for each material; and sketch the room/area layout, locations of sampling points and photographs, and layouts of major ACM-insulated equipment and pipes. He/She also codes all remaining data on our automated survey data form, including the sampling and size/quantity data.

* In general, Hygienetics follows EPA/AHERA criteria in determining the number of representative bulk samples to collect for each homogeneous material. However, these criteria may be varied depending on specific client needs and unusual conditions.

The Survey Team also routinely keeps appropriate building officials advised of daily work progress (i.e., where the team is located, and what buildings have been completed).

LIST OF STANDARD SURVEY EQUIPMENT

1. Spiral notebook, computerized inventory coding forms, and laboratory bulk sampling data forms.
2. Flashlights.
3. Rolling tape measures and rulers.
4. Hand water sprayer (to pre-wet sampling points).
5. Disposable paper towels (to clean up fallen sampling debris, and to wash hands).
6. Pocket knife.
7. Polyethylene sampling bags with write-on labels and twist-lock tops.
8. Duct tape (to repair sampling points).
9. Catch pan or plastic bags to collect any dislodged particles.
10. Disposal Tyvex coveralls.
11. Polyethylene bags for carrying tools and disposing of waste.
12. Half-facepiece air purifying respirators with replaceable HEPA cartridges (NIOSH-approved).
13. Yellow markers or paint (for labeling sampling points).
14. Camera and film (and a record log book).
15. Spray sealant.
16. Ladders (as necessary).

III. SAFETY PLAN

1. Respiratory Protection for Building Surveys

Personnel who conduct building surveys and collect samples of suspect asbestos-containing materials shall at all times strictly comply with the corporation's "Written Asbestos Respirator Plan".* The Plan requires that, at a minimum, NIOSH-approved half-facepiece air filtering respirators be worn by personnel whenever they are collecting bulk samples and at any other times they believe that detectable airborne levels of asbestos may be released in the process of conducting their inspection activities. This shall include inspecting areas which have floors (or other surfaces personnel may contact) that have visible amounts of surface debris or dust which may potentially contain asbestos fibers (e.g., removal of suspended ceiling tiles or inspecting crawlspaces, pipe or duct shafts, attics, and basement storage rooms).

Pursuant to our Respirator Plan, all personnel utilizing respiratory protection shall be medically approved by a licensed physician, and shall have been fit-tested as specified in the Plan within the past six months. Positive and negative fit checks shall be conducted by each employee immediately prior to each time a respirator is worn. Personnel shall fully comply with a client's respiratory protection requirements except where such requirements are less stringent than Hygienetics' plan.

2. Other Personal Protective Equipment Requirements

Except where a client or a local regulation has more stringent requirements, the following minimum standards shall apply to use of other personal protective equipment:

Disposable Coveralls: Shall be worn whenever inspecting any area containing significant amounts of visible dust or debris on floors, ceiling tiles, or other surfaces which personnel might contact during the inspection. Coveralls shall also be worn when collecting large numbers of bulk samples of highly friable ACM, or when inspecting crawlspaces or basements containing dirt floors. Coveralls shall have integral booties and head covers whenever possible. Used coveralls shall be placed inside sealed polyethylene bags, and then disposed of as asbestos-contaminated waste at an approved landfill.

* Copies of this plan shall be provided to clients upon request.

Gloves: Use of disposable rubber or plastic gloves is suggested when collecting bulk samples of friable materials if a means of cleaning your hands is not readily available (e.g., a nearby wash basin or a supply of disposable paper towels). Gloves should also be worn whenever use of disposable protective coveralls is warranted. Special hand protection should also be used when inspecting or collecting bulk samples on or near hot mechanical systems (e.g., live boilers or heated pipes).

Hardhats and Eye Protection: Hardhats complying with the requirements of ANSI Z89.1-1969 shall be worn whenever a client has designated their use in any area, or whenever there is a possible danger of head injury from impact, or from falling or flying objects. This shall include conducting inspections in any mechanical or utility spaces which have low hanging pipes, ductwork, or other systems (e.g., pipe tunnels, shafts, access platforms, fan rooms, manholes, etc.).

Eye and face protection meeting the requirements of ANSI Z87.1-1968 shall be used when inspecting areas where machines or industrial operations present potential eye or face injury from physical, chemical, or radiation agents. These areas shall include spaces where the following operations are conducted: grinding and machining, abrasive surface blasting, chipping, molten metal handling, arc welding, and chemical handling.

Ladders: The construction, installation, and use of ladders shall conform to the latest edition of the Safety Codes for Portable Wood Ladders, ANSI A14.1; Portable Metal Ladders ANSI A14.2.

Portable ladders shall be used at such a pitch that the horizontal distance from the top support to the foot of the ladder will not be greater than one fourth the vertical distance between these points.

3. Inspection of Restricted Access or Confined Spaces

Personnel shall strictly abide by the client's policies and procedures for entry into any spaces which they have defined as restricted access or confined. Such spaces shall include (at a minimum) shafts, tunnels, manholes, crawlspaces, vaults, attics, and unexcavated basements. Where no client policies and procedures exist, the following measures shall be followed:

- a. Ensure that the space has sufficient oxygen for breathing and no toxic gases are present. Conduct air tests per OSHA requirements to verify such

conditions unless the space is clearly provided with fresh air as evidence by operating mechanical air handling systems, or by airflow tests.

- b. Ensure that the space has adequate lighting to safely access all areas and properly perform the inspection tasks.
- c. Determine and then obtain any equipment necessary to ensure safe access to the area (e.g., safety harness, ladder, protective clothing or footwear, hardhat, 2-way radio, etc.). All equipment shall strictly comply with 29 CFR 1926 and in particular 1926.104 (Safety Belts, Lifelines, and Lanyards), 1926.105 (Safety Nets), 1926.100 (Head Protection), 1926.102 (Eye and Face Protection), and 1926.103 (Respiratory Protection).
- d. Advise client that you are accessing the area and (where necessary) ensure that sufficient personnel remain at the access point to provide a rescue in the event of an emergency.
- e. Install all safety equipment and enter the space.
- f. Advise client when the inspection is completed.

4. Collection of Samples and Protection of Building Occupants and Property

- a. Survey personnel shall at all times conduct their activities so that they minimize disruptions to building occupants, and prevent the release of airborne asbestos fibers or the contamination of building property. Whenever possible, survey activities should therefore be conducted when the building areas are vacant.
- b. Prior to collecting any bulk samples in an occupied area, the Survey Team Leader must ensure that all occupants have vacated the area or room and have been instructed not to return until advised to do so.*

* This requirement to vacate the room or area shall also apply to removing ceiling tiles to inspect the area above them for asbestos materials or debris.

- c. After occupants have vacated the room or area, install a small piece of polyethylene sheeting (or disposable towel) on the floor or other surfaces immediately below any point where a sample will be collected.
- d. Don proper respiratory protection (and protective coveralls if necessary) and then lightly wet the material to be sampled with a spray of water.
- e. Slowly and carefully remove a full-thickness sample of the material and immediately place it inside a sealed polyethylene plastic bag.
- f. Label the sampling point and bag, and complete all data and sampling forms.
- g. Carefully seal the sampling point with (as appropriate) an asbestos liquid encapsulant and/or duct tape (or other covering acceptable to the client).
- h. Carefully inspect the area around the sampling point for any visible dust or debris that may have fallen. Remove it by wiping with a wet disposable towel or a HEPA-vacuum.
- i. Carefully remove the protective polyethylene coverings on the floor and other surfaces, and place them inside sealed polyethylene bags for transport to a landfill approved for disposal of asbestos waste. Also place any used paper towels, respirator filters, or other potentially contaminated materials or equipment inside these bags for transport and disposal as asbestos waste.
- j. Carefully inspect the entire room or area to ensure all furnishings are returned to their original locations.
- k. Advise building occupants that they can return to the area or room.

5. Collection of ACM Samples On or Near Electrical or Moving Mechanical Equipment

Personnel shall not attempt to inspect or collect samples of suspect ACM on or near electrical or mechanical equipment until the equipment has been shutdown and locked out by a knowledgeable person. This shall include electrical panels, wiring systems, pumps, compressors, fans, elevators, and other utility or processing equipment.

6. Collection of ACM Samples On or Near Air Handling Systems or Vents

Personnel shall not attempt to collect bulk samples on or near air handling systems, registers, diffusers, or other sources of air collection or distribution until such systems are sealed airtight with tape or plastic sheeting to prevent their contamination. Where possible, such systems shall also be shutdown during the sample collection process.

7. Eating, Smoking and Drinking

Eating, smoking, and drinking shall not be permitted during the performance of inspection activities and collection of bulk samples. Eating, smoking and drinking shall be conducted only in areas designated by the client.

8. Personal Hygiene

Personnel shall promptly wash their hands and faces upon completion of inspection and bulk sample collection activities. Washing shall be conducted in a bathroom or washroom approved by the client, or by using disposable paper towels.

9. Communications with Building Occupants

Survey personnel should thoroughly discuss with the client before hand how to handle questions or communications with building occupants. Where a policy is not previously established and questions or communications are encountered, survey personnel should advise that they are "conducting a building inspection" and then politely refer the occupant to the designated client contact if they have further questions. Survey personnel should also immediately advise the client contact if they feel the occupant was not satisfied by this response or if they encounter any other situation which affects building occupants (e.g., situations which may pose an immediate exposure risk, unsafe conditions, or actions that may directly disturb ACM).

10. Storage and Cleaning of Bulk Sampling Tools

Knives, screwdrivers, chisels, and other tools used to collect bulk samples shall be thoroughly cleaned between collection of samples. Tools which cannot be immediately cleaned shall be kept in a separate sealed plastic bag identified as "Contaminated Field Equipment." Where possible, cleaning shall be accomplished by thoroughly washing with water at an approved sink or wash basin.

Otherwise, it shall be accomplished by wiping with a wet disposable paper towel. Equipment which cannot be thoroughly cleaned shall be placed inside a sealed polyethylene bag and disposed of as asbestos waste.

IV. TRAINING AND EDUCATION OF HYGIENETICS' EMPLOYEES

- a. Successful completion of formal asbestos training courses (initial and yearly refresher courses) is a mandatory requirement of employment with Hygienetics.

Immediately upon employment, all new technical employees must attend and successfully pass an EPA-approved 5-day "Asbestos Practices and Procedures" course. This course includes the following topics: characteristics of asbestos, health effects of asbestos exposure, respirator training, safe work practices and procedures, safety and emergency procedures, air sampling and analysis, documentation and recordkeeping.

- b. In addition to the above standard course, all employees are expected to successfully complete (within 6 months of hire) an EPA-approved 3-day Asbestos Inspector's course. Senior personnel are additionally expected to complete the related 2-day Management Planner course.
- c. All employees assigned to this project will be EPA-approved Asbestos Inspectors, Designers, and Abatement Project Supervisors. Each employee will have attended an EPA-approved initial (or refresher) course in each of these disciplines.
- d. All employees assigned to this project will additionally receive a specific briefing in the requirements of this project during the pre-survey and planning meeting which will be held before any field work begins. Changes and new information will be standard discussion items included in weekly internal progress meetings.

V. EMERGENCY PROCEDURES

- a. All employees assigned to the project will be given local emergency phone numbers in the event of an accident or emergency. The emergency phone numbers are:

Hospitals

See Arthur D. Little Health and Safety Plan

Fire Department

See Arthur D. Little Health and Safety Plan

- b. Safety and emergency procedures are thoroughly covered during employee's initial and annual refresher training courses. These procedures include:
- Falls, trips, or other related accidents;
 - Burns, heat exhaustion, and exposure accidents;
 - Electrical safety;
 - Clean-up and proper controls for bulk sampling procedures;

Attachment I: Subcontractor Health and Safety Plan (Lead Based Paint)

1.0 Introduction

- 1.1 Balsam Environmental Consultants, a unit of Dames & Moore, Inc. (Balsam) maintains a comprehensive company safety and health program. All field projects are conducted in accordance with this program. Each Balsam employee has a copy of the safety and health manual.
- 1.2 Arthur D. Little Co. has developed a site safety and health program for the Fort Devens project to cover many of the site safety and health issues specific to this project. Balsam will obtain a copy of this program, review it, and maintain a copy on site throughout the project.
- 1.3 In addition to the safety and health issues addressed in the two referenced safety and health manuals, Balsam has developed specific safety procedures relative to issues anticipated to be encountered during the conduct of the lead paint survey which are not covered in depth in either of the above-referenced safety manuals.
- 1.4 Mr. Randall Ames, Balsam's Project Manager will serve as the subcontractor's health and safety officer. He reports to Mr. Douglas Lawson, Balsam's corporate health and safety officer. Mr. Ames will assign the senior lead paint inspector to be the on-site health and safety coordinator.

2.0 Radiation Safety

- 2.1 The lead paint survey will be conducted using a Niton XL Spectrum Analyzer which is an x-ray fluorescence unit containing a Cadmium-109 radioactive source.
- 2.2 The instrument is designed so that radiation exposure to the user will not exceed normal background levels.
- 2.3 The instrument has three safety features including an initial safety interlock, a safety switch which must be depressed by the operator and a shutter plunger that must be pressed against the surface to be tested before the radioactive source is exposed.

- 2.4 The device will only be used when no building occupants are present in the room where testing is being conducted. The radioactive source is a low-level source and is not capable of penetrating building walls.
 - 2.4.1 A graph of the radiation profile for this instrument is included in this document as Figure 1.
- 2.5 Lead surveyors will attend a two day training course offered by Niton prior to conducting the survey.
- 2.6 Operators will follow the Niton operating instructions when using the instrument.
- 2.7 Operators will wear a film badge or radiation dosimeter whenever using the Niton instrument to monitor potential radiation exposure. The testing of the film badges will be conducted in accordance with Dames & Moore's (Balsam), corporate radiation safety program.
- 2.8 The Niton XL will be maintained at the Niton factory. No repairs or instrument maintenance (including replacing sources) will be conducted by the lead paint inspectors. If the instrument needs repair or is not calibrating properly, it will be shipped immediately to Niton for repair.

3.0 Portable Metal Ladders

- 3.1 Only ladders which meet both U. S. Occupational Safety & Health Administration (OSHA) and American National Standards Institute (ANSI) standards will be used to conduct this survey.
- 3.2 When in use, ladders will be set up so that the distance of the ladder base from the building is equal to one-quarter of the height of the ladder.
- 3.3 Ladders will not be erected near the point where the electrical service enters the building nor will they be transported from one location to another in an upright position.
- 3.4 Only one individual will be on the ladder at a time.
- 3.5 Whenever an individual is working on a ladder a second individual will be on the ground to support the ladder in a stable position.

- 3.6 Since work on this project will be conducted during winter months, inspectors will ensure that ladders are maintained free of snow and ice during use. In addition, ladders will be inspected for sharp edges, dents, bends, poor rung to slide rail connections, inoperable footings and sheared joints.

4.0 Cold Stress

- 4.1 Workers will wear appropriate clothing, including boots and gloves, based on the temperature and weather conditions during the time of the survey.
- 4.2 Outside survey work will be suspended if temperature or wind chill measurements are below ten degrees fahrenheit or if precipitation is falling.

5.0 Confined Space Entry

- 5.1 It is not anticipated that confined space entry will be an issue in conducting this lead paint survey. Should a situation occur where entry into a confined space is required to undertake work, the survey team will withdraw and contact the Project Manager.
- 5.2 The Project Manager will institute standard Balsam confined space entry procedures. Entry into confined spaces will not be permitted until the confined space entry program is approved by both Arthur D. Little and USAEC.

6.0 Site Safety Audits

- 6.1 Site safety audits will be conducted by the Project Manager, Mr. Randall Ames, on a weekly basis. Items identified during this weekly audit or relevant issues due to weather or changing site conditions will be discussed with the survey team and documented in the daily site log.

HASP, Fort Devens:

Supplement C

Section No.:

Attachment I

Revision No.:

1

Date:

November 14, 1994

Figure 1: Radiation Profile of Niton XL Model 309 on Sheetrock Substrate In mR/hr for 10 mCi Cd¹⁰⁹ Source with Shutter Open (Nov 7 93)

